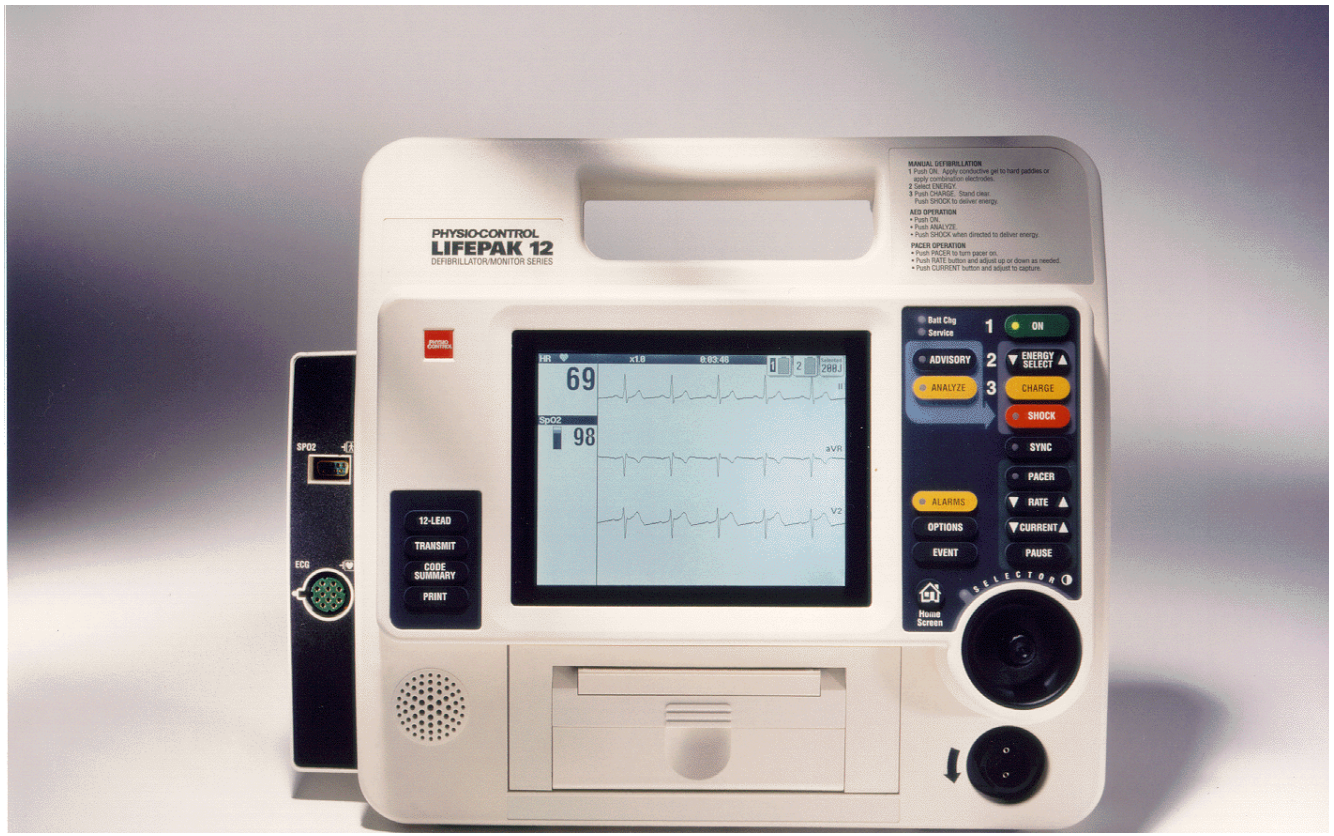
Medtronic
PHYSIO-CONTROL

LIFEPAK® 12 defibrillator/monitor series

Service Manual



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Preface

This Service Manual describes how to maintain, test, troubleshoot, and repair the LIFEPAK 12 defibrillator/monitor. A separate publication, the **LIFEPAK 12 defibrillator/monitor series Operating Instructions**, is for use by physicians, clinicians, and emergency care providers. The Operating Instructions provide step-by-step instructions as well as operator-level testing and maintenance.

Note: Hyperlinks appear in **Blue Text**. Text that indicates a control, menu, message, or screen overlay appears as small caps. For example, ADVISORY control and SETUP Menu.

This section covers the following topics:

Trademarks
Service Personnel Qualifications
Contacting Medtronic Physio-Control
Responsibility for Information
Device Tracking
Service Information
Recycling Information
Warranty
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Glossary
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Service Personnel Qualifications

Technicians who service the device must be properly qualified and thoroughly familiar with the operation of the LIFEPAK 12 defibrillator/monitor. Technicians must meet at least one of the following requirements (or the equivalent):

- Associate of Applied Science, with an emphasis in biomedical electronics
- Certificate of Technical Training, with an emphasis in biomedical electronics
- Equivalent biomedical electronics experience

Contacting Medtronic Physio-Control

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Responsibility for Information

This Service Manual describes the methods required to maintain, test, and repair the LIFEPAK 12 defibrillator/monitor. This manual does not cover operation of the LIFEPAK 12 defibrillator/monitor. Qualified service personnel must consult both the **LIFEPAK 12 defibrillator/monitor series Operating Instructions** and the LIFEPAK 12 defibrillator/monitor series Service Manual to obtain a complete understanding of the use and maintenance of the device.

It is the responsibility of our customers to ensure that the appropriate person(s) within their organization have access to the information in this Service Manual, including any warnings and cautions used throughout the LIFEPAK 12 defibrillator/monitor series Service Manual.

Device Tracking

USA only, including US government-owned devices:

The Food and Drug Administration requires defibrillator manufacturers and distributors to track the location of defibrillators. If your defibrillator has been sold, donated, lost, stolen, exported, or destroyed, or if it was not obtained directly from Medtronic Physio-Control, please notify Medtronic Physio-Control at 1.800.442.1142, extension 4530.

General information related to device tracking:

It is important to maintain accurate records of defibrillator location within your facility or system. Maintenance of such records eases the process of locating defibrillators should it be necessary to modify them. Defibrillators should be tracked by both the manufacturer's part and serial number. Internal asset or tracking numbers may also be useful in maintaining adequate control of defibrillators.

Service Information

Before attempting to clean or repair any assembly in this device, the technician should be familiar with the information provided in the **Preventive Maintenance** section.

A qualified technician should inspect any defibrillator that has been dropped, damaged, or abused to verify that the device is operating within performance standards listed in the **Performance Inspection Procedure (PIP)**, and that the leakage current values are acceptable.

Replacement procedures for the LIFEPAK 12 defibrillator/monitor are limited to those items accessible at the final assembly level. Replacements and adjustments must be made by **service personnel** qualified by appropriate training and experience. Replacements at the final assembly level simplify repair and servicing procedures, and help ensure correct device operation and calibration.

To obtain Medtronic Physio-Control service and maintenance for your LIFEPAK 12 defibrillator/monitor, contact your local service or sales representative. In the USA, call Medtronic Physio-Control Technical Services at 1.800.442.1142. Outside the USA, contact your local Medtronic Physio-Control representative.

Recycling Information

Recycle the device at the end of its useful life.

- Recycling Assistance – The device should be recycled according to national and local regulations. Contact your local Medtronic Physio-Control representative for assistance.
- Preparation – The device should be clean and contaminant-free prior to being recycled.
- Recycling of Disposable Electrodes – After using disposable electrodes, follow your local clinical procedures for recycling.
- Recycling of Batteries – The device uses rechargeable FASTPAK, FASTPAK 2 NiCd (Nickel-Cadmium) and LIFEPAK NiCd, and LIFEPAK SLA (sealed lead-acid) batteries. Follow local guidelines and instructions given in this Service Manual for **discarding/recycling batteries**.
- Packaging – Save or recycle packaging materials.

Warranty

Refer to the Warranty statement included in the **Operating Instructions – Maintaining the Equipment**.

Configuration Information

This Service Manual covers existing LIFEPAK 12 defibrillator/monitor series devices and options through the following revisions:

- LIFEPAK 12 Monophasic Basic Device with ECG
- LIFEPAK 12 Biphasic Basic Device with ECG
- Pacing Option
- SpO2 Option
- 12-Lead Option
- NIBP Monitor Option
- EtCO2 Option
- Fax/Data Communication Option
- ElectroLuminescent (EL) Display Option
- Invasive Pressure Option
- Vital Signs Trending Option

Glossary

The following are definitions of terms used throughout this Service Manual.

- Automated External Defibrillator (AED) — The LIFEPAK 12 defibrillator/monitor uses an ECG analysis Shock Advisory System (SAS) to advise the device operator if it detects a shockable or nonshockable rhythm. For more information about CPSS and SAS, see the **Operating Instructions – Shock Advisory System**.
- Biphasic — Property of the shock waveform generated by the LIFEPAK 12 biphasic defibrillator/monitor. The biphasic waveform is characterized by a positive current phase followed by a reverse current phase of shorter duration and decreased magnitude. The waveform pulse characteristic is biphasic truncated exponential (BTE).
- CODE SUMMARY™ Report — A summary report that includes the ECG segments associated with key events such as analysis or shock. See the **Operating Instructions — Data Management** for a sample CODE SUMMARY Report.

Glossary

- Continuous Patient Surveillance System (CPSS) — A feature that monitors the patient ECG in LEADS or PADDLES for a potentially shockable rhythm. CPSS is active when the front panel ADVISORY indicator is on (AED Mode) or the VF/VT ALARM is selected after pressing the ALARMS control (Manual Mode). The CPSS operates in conjunction with the Shock Advisory System (SAS). For more information about CPSS and SAS, see the **Operating Instructions — Shock Advisory System**.
- Edmark — Property of the shock waveform generated by the LIFEPAK 12 Monophasic defibrillator/monitor. The Edmark pulse characteristic is monophasic damped sinusoid (MDS) per AAMI DF2-1989 3.2.1.5.1.
- End-Tidal Carbon Dioxide (EtCO2) — A noninvasive capnometer that monitors EtCO2, FiCO2, and respiration rate.
- Event Log Summary — A report summarizing important events for a particular patient record; part of the CODE SUMMARY Report.
- FAST-PATCH™ disposable defibrillation/ECG electrodes — An electrode system that allows delivery of defibrillation therapy to the patient.
- Monophasic — See Edmark.
- Noninvasive Blood Pressure (NIBP) — An optional meter that checks systolic, diastolic, and mean arterial blood pressure, along with pulse rate.
- QUIK-COMBO™ pacing/defibrillation/ECG electrodes — An electrode system that allows delivery of pacing and defibrillation therapy to the patient.

Glossary

- QUIK-COMBO patient simulator — A combination lead tester/patient cardiac rhythm simulator. The simulator is designed for use in training clinical personnel in the operation of the LIFEPAK 12 defibrillator/monitor.
- REDI-PAK™ preconnect system — A variant of the QUIK-COMBO pacing/defibrillation/ECG electrodes system. The system allows QUIK-COMBO pacing/defibrillation/ECG electrode cable connection without removing the electrodes from their air-tight sealed pouch until needed.
- Shock Advisory System (SAS) — A computerized ECG analysis system for use in the detection of a shockable rhythm. For more information about CPSS and SAS, see the **Operating Instructions — Shock Advisory System**.
- SpO2 — A noninvasive pulse oximeter that checks the saturation of oxygen in arterial blood.
- Test Load — A device that provides an external defibrillation test load for the defibrillator/monitor. The test load connects to the patient connector on the device.

Acronyms

The following is a list of acronyms and abbreviations used in this manual.

Term	Description
AAMI	Association for the Advancement of Medical Instrumentation
ADC	Analog-to-Digital Conversion
AED	Automated External Defibrillator
A/H	Amp/Hours: A measure of battery capacity
AHA	American Heart Association
AMI	Acute Myocardial Infarction
ANSI	American National Standards Institute
ASIC	Application-Specific Integrated Circuit
BTE	Biphasic Truncated Exponential
BF	Electrically isolated, external body connection
BPM	Beats Per Minute
CF	Electrically isolated, direct cardiac connection
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit
CPSS	Continuous Patient Surveillance System
DDE	Disposable Defibrillation Electrodes
DSP	Digital Signal Processor

Acronyms

Term	Description
DUART	Dual Universal Asynchronous Receiver/Transmitter
DMM	Digital Multimeter
ECG	Electrocardiogram
EMS	Emergency Medical Service
ESCC	Energy Storage Capacitor Charger
ESD	Electrostatic Discharge
ESU	Electrosurgical Unit
EtCO2	End-Tidal Carbon Dioxide
FiCO2	Inspired Carbon Dioxide
HR	Heart Rate
IEC	International Electrical Commission
IP	Invasive Pressure
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MDS	Monophasic Damped Sinusoidal
MMHg	Millimeters of Mercury
NIBP	Noninvasive Blood Pressure
NiCd	Nickel-Cadmium (battery)

Acronyms

Term	Description
NHAAP	National Heart Attack Alert Program
NSR	Normal Sinus Rhythm
OEM	Original Equipment Manufacturer
RR	Respiration Rate
PC	Personal Computer
PCB	Printed Circuit Board
PCMCIA	Personal Computer Memory Card International Association
PIP	Performance Inspection Procedure
PPM	Pulses Per Minute
QRS	Refers to portions of the ECG waveform
RISC	Reduced Instruction Set Computer
RTC/ NVRAM	Real Time Clock/Non-Volatile Random-Access Memory
RTS	Radio Transparent System
SAS	Shock Advisory System
SLA	Sealed Lead-Acid (battery)
SpO2	Pulse Oximeter reading (saturation of oxygen in arterial blood)
SSD	Static-Sensitive Device

Acronyms

Term	Description
TCP	Test and Calibration Procedure
UUT	Unit Under Test
VF	Ventricular Fibrillation
VT	Ventricular Tachycardia
µA	MicroAmpere

Safety

The Safety section describes the general safety conventions, terms, and symbols used in this Service Manual or on the LIFEPAK 12 defibrillator/monitor front and rear panels. This information is intended to alert service personnel to recommended precautions in the care, use, and handling of this specialized medical device.

Terms

General Warnings and Cautions

Symbols

Terms

The following terms are used in this Service Manual or on the various configurations of the LIFEPAK 12 defibrillator/monitor. Familiarize yourself with their definitions and significance.

Danger: Immediate hazards that will result in serious personal injury or death.

Warning: Hazards or unsafe practices that could result in serious personal injury or death.

Caution: Hazards or unsafe practices that could result in device or property damage.

Note: Points of particular interest for more efficient or convenient device operation; additional information or explanation concerning the subject under discussion.

General Warnings and Cautions

The following are general warnings and cautions. Keep these warnings and cautions in mind when working with the LIFEPAK 12 defibrillator/monitor. More specific warnings and cautions appear throughout this Service Manual and the LIFEPAK 12 defibrillator/monitor Operating Instructions.

WARNINGS!

Possible fire or explosion. Do not service this device in the presence of flammable gases, anesthetics, or oxygen sources.

Shock or fire hazard. Do not immerse any portion of this device in water or other fluids. Avoid spilling any fluids on the device or accessories. If the device is ever immersed in water or other fluids, remove the batteries and disconnect input power source from any attached AC or DC Power Adapter until the device can be serviced.

Patient hazard. Do not mount the device directly above patient. Place the device in a location where it cannot harm the patient should it fall from its shelf or other mount.

Shock or fire hazard. Equipment or accessories improperly interconnected to each other can be a source of ignition or cause a shock. Make sure that all equipment is interconnected safely.

General Warnings and Cautions

WARNING!

Shock hazard. Servicing of this device must be performed by properly trained individuals. This device may retain potentially lethal charges accessible inside the device at any time–even when off. Follow procedures carefully for discharging the A15 Energy Storage Capacitor and the Pacing Capacitor on the A04 Therapy PCB.

CAUTIONS!

Possible equipment damage. This device may be damaged by mechanical or physical abuse such as immersion in water or dropping. If the device has been abused, remove it from use and contact qualified service personnel.

Possible device damage. To help prevent component damage, do not mount the device near vibration sources such as engine struts or landing gear.

Symbols

The following list includes symbols that may be used in this Service Manual or on various configurations of the LIFEPAK 12 defibrillator/monitor and accessories. Some symbols may not be relevant to your device or used in every country.

Defibrillation-proof type CF terminal

Defibrillation protected, type BF patient connection

Attention, consult accompanying documents

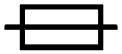
Warning, high voltage

Biphasic defibrillation shock

Type BF patient connection

Static-sensitive device (SSD)

Symbols

	Safety Class II equipment (reinforced insulation)
	Type B equipment
	Fuse
+	Positive terminal
–	Negative terminal
LOT YYWW	Lot number (batch code)
	Use by expiration date
REF	Reorder number (catalog number)
	Date of manufacture
	Single use only
	Indoor use only

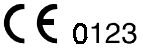
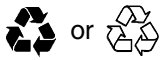
Symbols

	Alarm on
	Alarm off
	VF/VT alarm on
	VF/VT alarm silenced or suspended
>	Greater than
<	Less than
J	Joules
	LCD Contrast control
	Home screen button
	Selector indicator
	LIFEPAK SLA battery

Symbols

	FASTPAK or LIFEPAK SLA battery in well 1, in use
	FASTPAK battery
	FASTPAK 2 battery
	FASTPAK or LIFEPAK SLA battery in well 2, not in use
	FASTPAK or LIFEPAK SLA battery in well, discharged
	LIFEPAK NiCd battery
	LIFEPAK NiCd battery in well, fully charged, not in use
	LIFEPAK NiCd battery in well, discharged
	Heart rate/pulse rate indicator

Symbols

	Shock count (x) on screen
	Marking of conformity according to the Medical Device Directive 93/42/EEC by notified body TÜV Product Service GmbH
	Canadian Standards Association certification for United States (Nationally Recognized Test Laboratory) and Canada
	DC voltage
	AC voltage
	On (power: connection to the AC mains)
	Off (power: disconnection from the AC mains)
	Power on/off
	[signal] Input
	[signal] Output
	Recycle this product

Symbols

Recycle NiCd battery

Recycle Nickel Cadmium battery

Recycle Lead-acid battery

See instructions for recycling instructions
See instructions for disposal procedure

AC to DC adapter

System connector

Telephone line connector

Switch on

Switch off

Pace arrow, noninvasive pacing

Pace arrow, internal pacing

Symbols

	R-wave sense marker
	Event marker
	CO2 exhaust
	Chassis ground
	Recognized component mark for Canada and the United States
	LIFEPAK 12 to LIFEPAK 12 cable
!USA	For USA audiences only

Device Description

This section describes how the LIFEPAK 12 defibrillator/monitor works. Topics include input signals, assembly functions, and device outputs. This section also provides a description of the physical characteristics and functionality of the LIFEPAK 12 defibrillator/monitor.

Introduction

Physical Description and Features

Ordering Devices, Supplies, and Accessories

System Context Diagram

Functional Description

Introduction

About the Device

The LIFEPAK 12 defibrillator/monitor is a complete acute cardiac care response system with both manual and semi-automatic defibrillation operation. When clinically indicated, the LIFEPAK 12 defibrillator/monitor allows the operator to deliver a brief, high-energy pulse of electricity to the heart of the patient. Operators may pre-configure the device to reduce complexity during normal operation. Built-in service features include self-calibration and testing.

Energy Waveforms

The LIFEPAK 12 defibrillator/monitor series includes two distinct versions characterized by different defibrillator waveform technologies: monophasic and biphasic. The Monophasic (Edmark) device generates a monophasic damped sinusoidal (MDS) shock pulse, while the Biphasic device generates a biphasic truncated exponential (BTE) shock pulse for defibrillation.

Energy Delivery

The LIFEPAK 12 defibrillator/monitor standard method of energy delivery is through self-adhesive QUIK-COMBO pacing/defibrillation/ECG electrodes. When using these disposable defibrillation electrodes (DDEs), internal circuitry continuously measures the impedance between the electrodes and allows defibrillation only when the defibrillation electrodes are attached to the patient. The user may select from a variety of optional accessories for energy delivery (for example, standard hard paddles or internal paddles).

Introduction

Manual Mode Operation

In **Manual Mode** (ADVISORY indicator off), the device allows the operator to manually select an energy level, initiate a charge sequence, and apply energy in either direct or synchronized modes. When the operator selects the VF/VT ALARM from the ALARMS Menu, the Continuous Patient Surveillance System (CPSS) monitors the patient's ECG for a shockable rhythm. A suspect rhythm alerts the operator with a priority tone and screen overlay. The operator can then follow locally established guidelines for the administration of defibrillation therapy.

Advisory Mode Operation

In the **Advisory Mode** (ADVISORY indicator on), the device uses the CPSS to monitor the patient's ECG for a shockable rhythm. A suspect rhythm alerts the operator with a priority tone and screen overlay. The operator may continue by pressing the ANALYZE control, which allows the Shock Advisory System (SAS) to analyze the ECG rhythm and make recommendations. The operator can then follow locally established guidelines for the administration of defibrillation therapy. For more information about CPSS and SAS, see the **Operating Instructions, Appendix D**.

Introduction

Device Primary Functions

The device has six primary functions:

- Defibrillation
  - Manual or semi-automatic (AED) defibrillation
  - Leads off detection for therapy and ECG electrodes
  - Synchronized Cardioversion
- Noninvasive Pacing
  - Demand and Nondemand modes of operation
- Capture Patient Information
  - Stores both patient and device data at each event
  - Real-time clock provides time stamps for events
  - Provides operator review of stored events for printout or transmission
- Patient Signal Monitoring
  - ECG monitoring–displays up to three ECG waveforms at once
  - Pulse Oximetry (SpO2) monitoring, continuous display
  - Heart rate monitoring, continuous display
  - Noninvasive blood pressure (NIBP) monitoring, continuous display
  - Invasive pressure (IP) monitoring, continuous display
  - Capnography (EtCO2 and RR) monitoring, continuous display
  - Waveforms display pace and sense markers
  - Ventricular Fibrillation/Ventricular Tachycardia monitoring and alarm

Introduction

Device Primary Functions (continued)

- Capture and Analyze 12-lead ECG
  - Captures up to 45 minutes of continuous ECG data
  - Continuous printing of ECG data
  - Transmit ECG data to a remote site
  - Acquire and analyze 12-lead data
- Manage Alarms and Warnings
  - Places alarm limits on patient monitoring parameters
  - Automatic alarm limit reset at operator request
  - Activates or disables alarms and stores alarm events
  - Silence alarms for up to 15 minutes
  - Visual indicators and audible tones in alarm conditions

Service features include calibration and diagnostic functions.

Introduction

Assemblies

The LIFEPAK 12 defibrillator/monitor consists of a two-piece case assembly that encloses the following printed circuit boards (when fully configured with options):

1. A01 System PCB
2. A02 Memory PCB
3. A03 Power PCB
4. A04 (Edmark) / A04 (Biphasic) Therapy PCB
5. A05 Interface PCB
6. A06 OEM PCB
7. A07 Contact PCB
8. A08 Backlight PCB (LCD)
9. A16 SpO2 Module
10. A21 NIBP Module
11. A22 Biphasic PCB (Biphasic)
12. A23 EtCO2 Module

... and the following subassemblies:

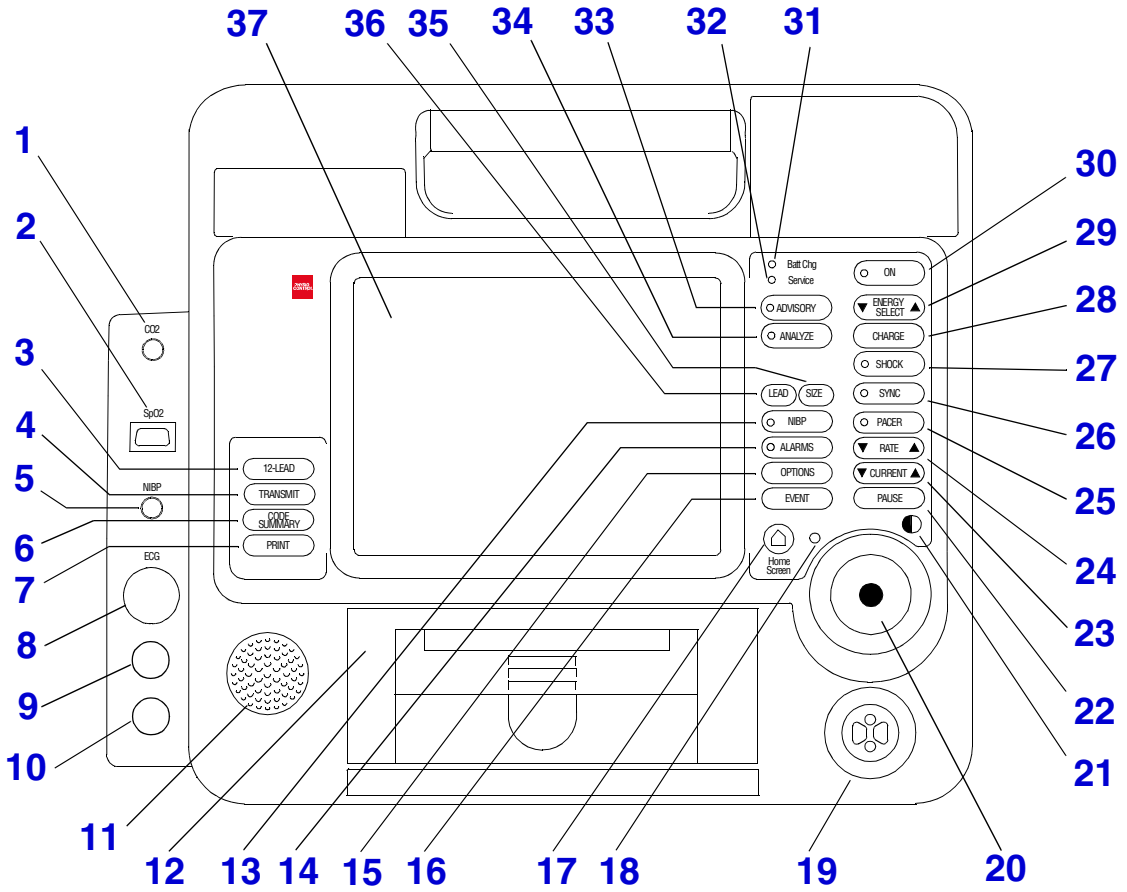
1. A09 Small Keypad
2. A10 Large Keypad
3. A11 (LCD) / A11 (EL) Display Assembly
4. A12 Printer Assembly
5. A13 Transfer Relay Assembly
6. A14 Waveshaping Inductor (Edmark) / A14 Inductive Resistor (Biphasic)
7. A15 (Edmark) / A15 (Biphasic) Energy Storage Capacitor
8. A17 Interconnect Bracket

In addition, there are two battery wells, W10 Battery Pins (4x), W07 ECG Connector Cable, W08 System Connector Cable, W09 Auxiliary Connector Cable, W11 Therapy Connector Cable, W22 SpO2 Connector Cable, W15 Selector Assembly, W17 Speaker Assembly, C15 Pacing Capacitor, and associated labels, wiring, and hardware. See the **Interconnect Drawing—Edmark** or **Interconnect Drawing—Biphasic**.

Physical Description and Features

Front Panel

For information about any controls, indicators, or connectors, click on a number.



Physical Description and Features

Number	Description
1	CO2 Connector (optional) — Intake port for the EtCO2 monitor. This is a device that continuously measures the amount of CO2 during each breath and reports the amount present at the end of exhalation (EtCO2).
2	SpO2 Connector (optional) — Connection point for the pulse oximeter. This is a noninvasive device that checks the saturation of oxygen in arterial blood. SpO2 is used for monitoring patients who are at risk of developing hypoxemia.
3	12-LEAD control (optional) — Press to initiate the acquisition, analysis, storage, and printing of a 12-lead ECG report.
4	TRANSMIT control — Press to transmit ECG episode records to another location through a direct, landline telephone or cellular telephone connection.
5	NIBP Connector (optional) — Port for connection to the blood pressure cuff. This measures the blood pressure of the adult or pediatric patient.

Physical Description and Features

Number	Description
6	CODE SUMMARY control — Press to print a summary of the current patient conditions, including patient name, critical event record, and ECG waveforms.
7	PRINT control — Press to print a continuous ECG stripchart. Press again to stop printing.
8	ECG Connector — Connection point for the electrically isolated ECG patient cable. Cable configurations include the 12-lead main cable, with limb lead and precordial lead attachments, and the 3-lead cable.
9	P1 Connector — Connection point for the invasive pressure cables. This device invasively measures arterial blood pressures, central venous pressure (CVP), or intracranial pressure.
10	P2 Connector — Connection point for the invasive pressure cables. This device invasively measures arterial blood pressures, central venous pressure (CVP), or intracranial pressure.
11	Speaker — Provides audio voice prompts and alert tones.

Physical Description and Features

Number	Description
12	Printer — Prints ECG waveforms, CODE SUMMARY Reports, and related topics. The 50 mm printer is standard and the 100 mm printer is optional, except for devices with the 12-lead ECG option or EtCO2 option, where the 100 mm printer is standard.
13	NIBP control — Press to initiate blood pressure measurement.
14	ALARMS control and indicator — Press to display the ALARMS overlay. The choices are: QUICK SET, LIMITS, SILENCE, and VF/VT ALARM. The indicator lights steady when setting alarms and flashes when an alarm condition exists.
15	OPTIONS control — Press to display the OPTIONS overlay. The choices are: PATIENT for entering patient data, PACING to set demand or non-demand pacing, DATE/TIME, ALARM VOLUME, REPORTS for stored patient reports, PRINTER to set the printer frequency response, and a USER TEST.
16	EVENT control — Press to display the EVENTS overlay. Your event choice is appended as an Event on the patient report, along with a date/time stamp.

Physical Description and Features

Number	Description
17	Home Screen control — Press to return to the home screen of the particular option or feature you are configuring. Pressing this control does not take you to a specific screen; instead, it returns to the home screen for the mode or event you are configuring.
18	Selector indicator — Lights when the **Selector** is active.
19	Therapy Connector — Connection point for the following: ■ QUIK-COMBO electrodes (standard) ■ FAST-PATCH electrodes (with optional cable) ■ Standard adult external paddles (optional) ■ Internal paddles with discharge control (optional) ■ External sterilizable paddles (optional) ■ Pediatric paddles (clip onto adult external paddles) ■ Posterior paddle (clips onto adult external APEX paddle) ■ Devices such as a test load or patient simulator
20	Selector — When active, turn (either direction) to make choices from the menu or overlay shown on the screen. The Selector indicator will illuminate your selection. Press to enter your choice.

Physical Description and Features

Number	Description
21	◐ Screen contrast control (LCD only) — Press to adjust the display screen contrast. After pressing, rotate the Selector to select the desired contrast, then enter by pushing the Selector.
22	PAUSE control (optional) — Press and hold to reduce the selected pacing rate to 25% of the original rate. The selected pacing current remains the same. Release to resume the selected pacing rate. When in Pause, a message is displayed at the bottom of the display screen.
23	▼CURRENT▲ control (optional) — Press to display the PACING overlay. Press the up-arrow or down-arrow portion of the control to adjust pacing current in 10 mA increments, or rotate the Selector to change the current in 5 mA increments.
24	▼ RATE ▲ control (optional) — Press to display the PACING overlay. Press the up-arrow or down-arrow portion of the control to adjust pacing rate in 10 ppm (pulses per minute) increments, or rotate the Selector to change the rate in 5 ppm increments.

Physical Description and Features

Number	Description
25	PACER control and indicator (optional) — Press to activate pacing and light the indicator. You must be in Manual Mode and have QUIK-COMBO leads attached or the indicator will not light. Pressing this control trips the device out of the Defibrillation Mode, terminates synchronized cardioversion, and dumps any energy stored on the defibrillation capacitor.
26	SYNC control and indicator — Press to activate synchronized cardioversion and light the indicator. You must be in Manual Mode to use SYNC. When synchronized, the indicator flashes with each detected QRS complex. Press again to deactivate SYNC.
27	SHOCK control and indicator — Press to deliver energy in either Advisory Mode or Manual Mode. The indicator flashes when the device is fully charged. Operation with hard paddles is similar, except you use the shock buttons on the paddles to deliver energy.

Physical Description and Features

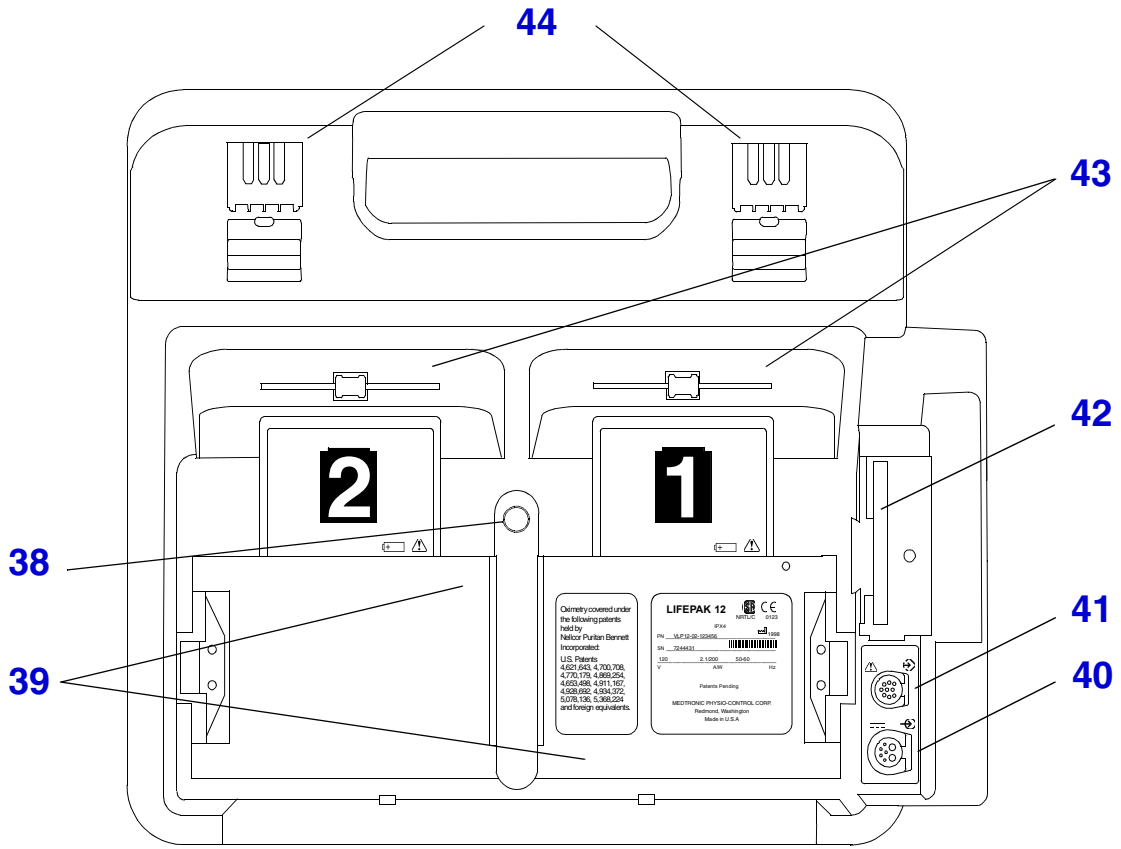
Number	Description
28	CHARGE control — Press to start a charge sequence. You must be in Manual Mode and have QUIK-COMBO leads or hard paddles attached. When operating with hard paddles, use the charge button on the paddles. If you are pacing, pressing this control trips the device out of Pacing Mode.
29	▼ ENERGY SELECT ▲ control — Press to select an energy level. You must be in Manual Mode to use this control. There are multiple selectable energy levels between 2 J and 360 J, with internal paddles limited to 50 J maximum.
30	ON control and indicator — Press to turn the LIFEPAK 12 defibrillator/monitor on and off. The indicator is illuminated when the device is turned on.
31	Batt Chg indicator — Lights when the device is powered by an AC Power Adapter or DC Power Adapter and at least one battery is installed in the device and charging.

Physical Description and Features

Number	Description
32	Service indicator — Lights when service error codes are written into the error log (accessed through the **Service Mode**). See **Troubleshooting** for information about the error codes.
33	ADVISORY control and indicator — Press to switch between Manual Mode (indicator off) and Advisory Mode (indicator on). In Advisory Mode, the Continuous Patient Surveillance System (CPSS) monitors the patient's ECG for a potentially shockable rhythm.
34	ANALYZE control and indicator — Press to activate the Shock Advisory System (SAS) in Advisory Mode, which analyzes the patient's ECG for a potentially shockable rhythm. The indicator lights when SAS is active.
35	LEAD control — Press to select ECG lead for lead set.
36	SIZE control — Press to select ECG lead size.
37	Display screen — The ElectroLuminescent (EL) or Liquid Crystal Display (LCD) screen displays operating messages, waveforms, status messages, setup screens, and so forth.

Physical Description and Features

Back Panel



Physical Description and Features

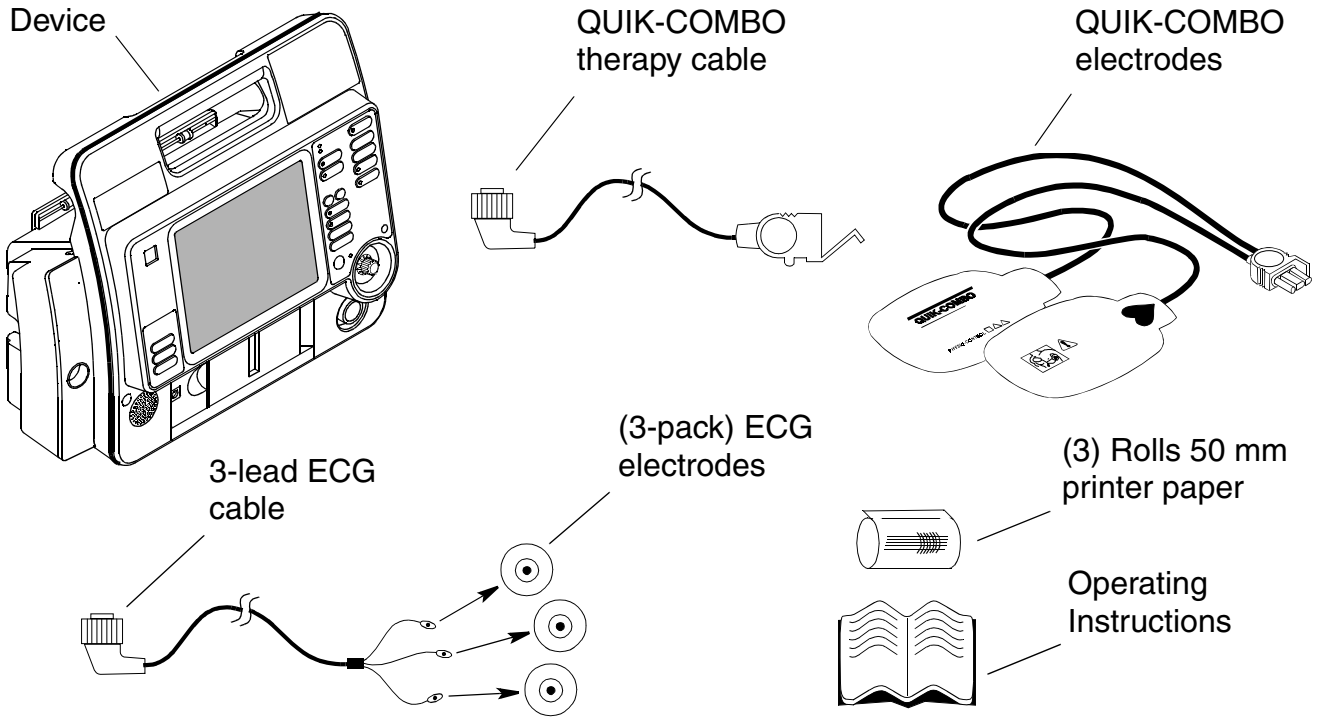
Back Panel

Number	Description
38	CO2 Exhaust Port (optional) — Vents gasses from CO2 monitor.
39	Battery compartments — Accommodate two removable battery paks that provide power for the LIFEPAK 12 defibrillator/monitor.
40	Auxiliary Connector — Connection point for an AC Power Adapter or DC Power Adapter.
41	System Connector — Connection point for a modem or computer for transmitting patient reports, and for an ECG analog output. You can also connect to another LIFEPAK 12 defibrillator/monitor for exchanging setup configuration data.
42	Modem Door — Cover for a PC Card modem or other PC Card accessory.
43	Standard paddle wells — Storage area for a set of standard paddles.
44	Gurney Hooks — To mount the defibrillator monitor from a gurney rail.

Physical Description and Features

What Is Shipped with a Basic Device

A basic device includes the components shown below. For additional information about components, see Accessories, Supplies, and Training Tools in the **LIFEPAK 12 defibrillator/monitor Operating Instructions – Maintaining the Equipment**.



Devices, Options, Supplies, and Accessories

The following table, provided for reference, summarizes optional configurations, supplies, and accessories that are available. For part numbers and up-to-date ordering information, see the latest operating instructions.

Item	Description	Reference
LIFEPAK12 defibrillator/monitor		
Basic Device	Device with 50 mm Printer. Includes: ■ 3-lead ECG cable ■ 3-pack LIFE-PATCH® ECG electrodes ■ QUIK-COMBO therapy cable ■ Two sets QUIK-COMBO electrodes ■ Therapy Electrode operating instructions ■ Device operating instructions ■ 3 rolls of 50 mm printer paper	LIFEPAK 12 FAST-PATCH therapy cable and FAST-PATCH® PLUS pacing/defibrillation/ECG electrodes or Standard Hard Paddles can be purchased instead of QUIK COMBO cable and electrodes
Language		
	English French German Spanish Swedish Italian Finnish Dutch Polish Portuguese Danish Norwegian Korean	Specify language

Ordering Devices, Supplies, and Accessories

Item	Description
Optional Features	
Pacing	Upgradable in the field Accessories: ■ QUIK-COMBO Therapy Cable
SpO2	Upgradable in the field Accessories: ■ Nellcor SpO2 Sensors ■ SpO2 Sensor Extender Cable
EtCO2	Upgradable in the field Accessories: ■ Airway Adapter ■ FilterLine ■ Nasal FilterLine
NIBP	Upgradable in the field Accessories: ■ Reusable blood pressure cuff ■ Disposable blood pressure cuff

Ordering Devices, Supplies, and Accessories

Item	Description
Optional Features	
IP	Upgradable in the field Accessories: See **Operating Instructions** for IP accessories.
12-Lead ECG	Upgradable in the field. Includes: ■ Main trunk cable ■ 4-wire limb lead attachment ■ 5-wire precordial lead attachment ■ Two 3-pack LIFE-PATCH ECG electrodes ■ One 4-pack LIFE-PATCH ECG electrodes ■ 12-Lead quick reference card ■ 100 mm printer instead of 50 mm printer ■ Two rolls of 100 mm printer paper
Electroluminescent (EL) Display	Upgradable in the field High-Visibility display option for in hospital applications.
100 mm Printer upgrade	Upgradeable in the field Adds multi-channel recording capability.

Ordering Devices, Supplies, and Accessories

Item	Description
Optional Therapy Delivery	
FAST-PATCH therapy cable	Optional
Standard Paddles (can be purchased instead of QUIK-COMBO cable and electrodes)	Pair
Pediatric Paddle Adapter (attach to Standard Paddles)	Two required
Posterior Paddle Adapter (attach to Standard Paddles)	Each
External Sterilizable Paddles (attach to Standard Paddles)	Pair
Invasive Pressure	Invasive Pressure Cable Invasive Pressure Transducer See **Operating Instructions**.

Ordering Devices, Supplies, and Accessories

Item	Description
Electrodes	
QUIK-COMBO EDGE System Multifunctional Electrodes	■ Standard — one pair ■ REDI-PAK™ preconnect system — one pair ■ Radio Transparent System (RTS) — one pair ■ RTS, Pediatric — one pair ■ Long Lead Wire Electrodes — one pair
FAST-PATCH PLUS pacing/ defibrillation/ECG Electrodes	One pair
LIFE-PATCH ECG Electrodes (for monitoring only)	Sets of 3 or 4
Internal Paddle Handles and Cable	One pair (with discharge control)

Ordering Devices, Supplies, and Accessories

Item	Description
Power Options	
Batteries (two per device)	■ FASTPAK NiCd ■ FASTPAK 2 NiCd (with fuel gauge) ■ LIFEPAK NiCd (with fuel gauge) ■ LIFEPAK SLA
Battery Support System	■ Battery Support System 2 (BSS 2) — includes power cord and operating instructions ■ (Required for FASTPAK, FASTPAK 2 and LIFEPAK NiCd batteries) ■ BSS 2 Wall Mount Bracket (optional)
Power Adapters	■ AC Power Adapter (includes power cord and built-in output cable) ■ DC Power Adapter — 12 Volt (includes built-in output cable) ■ Extension Output Cable for AC/DC Power Adapters

Ordering Devices, Supplies, and Accessories

Item	Description
Data Management and Communications	
Modems	■ Internal PC Card modem, 55.6k (PC Card and cable) ■ Modem Door Assembly (required for Internal PC Card modem) ■ External Modem (requires an External Modem Adapter Cable) ■ External Modem Adapter Cable — 6 feet ■ External Modem Adapter Cable — 10 feet
Cables	■ Device-to-PC Serial Port Interface Cable (connect to a serial port on a PC or other equipment) ■ Device-to-Device (used to transfer a setup configuration between devices) ■ Analog ECG Output Cable (used to monitor ECG waveforms on external equipment)
PC Software	■ CODE-STAT Suite data management system for PCs

Ordering Devices, Supplies, and Accessories

Item	Description
Training Tools	
FAST-PATCH	■ Patient Simulator — with FAST-PATCH Posts (used with FAST-PATCH Therapy Cable) ■ FAST-PATCH Training Electrodes — one pair (used with FAST-PATCH Therapy Cable) ■ FAST-PATCH Training Electrode Cable
QUIK-COMBO	■ Patient Simulator, QUIK-COMBO, 3-Lead ■ Patient Simulator, QUIK-COMBO, 12-Lead (used with 12-Lead ECG feature) ■ QUIK-COMBO Training Electrodes - one pair ■ QUIK-COMBO Training Electrode Cable ■ QUIK-COMBO Test Post Adapter (use with Patient Simulator with FAST PATCH Posts)
Testers	■ Defibrillation Checker ■ Test Load — for use with QUIK-COMBO therapy cable only

Ordering Devices, Supplies, and Accessories

Item	Description
Technical Manuals	
Operating Instructions	■ Printed, one included per device, no charge
Service Manual	■ CD-ROM, one included per order, no charge (Printed version optional)
Carrying Bags	
Carrying Bags	■ Basic Carrying Bag — device only (includes shoulder strap and right pouch) ■ Basic Carrying Bag — device with AC or DC Power Adapter (includes shoulder strap and right pouch) ■ Left Pouch (requires Basic Carrying Bag) ■ Top Pouch (requires Basic Carrying Bag) ■ Back Pouch — Small (requires Basic Carrying Bag) ■ Back Pouch — Large (requires Basic Carrying Bag) ■ Front Cover (requires Basic Carrying Bag)

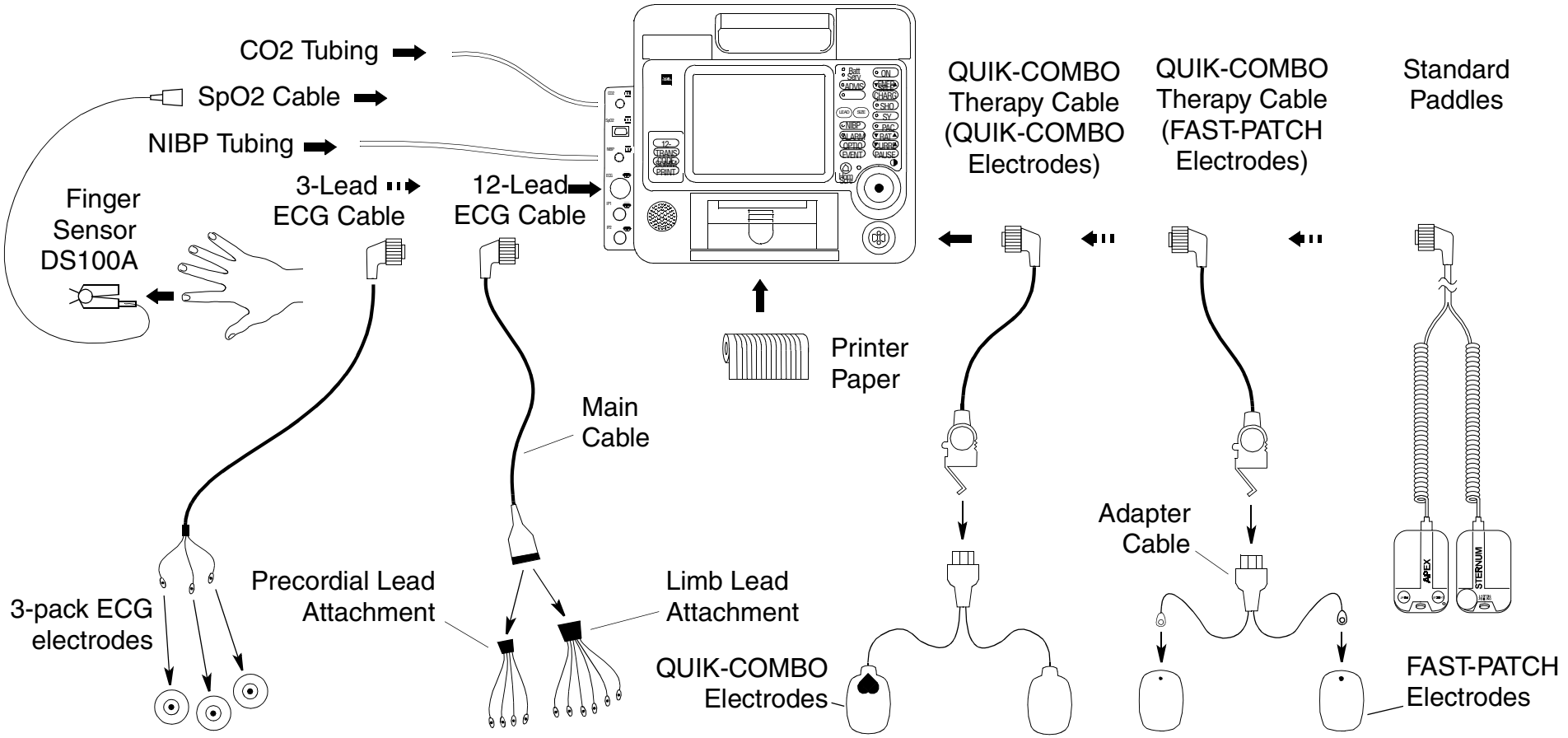
Ordering Devices, Supplies, and Accessories

Item	Description
Supplies	
Printer Paper	■ 50 mm Printer Paper — Box of 3 rolls (for products with 50 mm printer) ■ 100 mm Printer Paper — Box of 2 rolls (for products with 100 mm printer)
DERMA JEL	■ Use with Hard Paddles

System Context Diagram

Front of Device

The system context diagram shows you how the device connects with external equipment, including accessories, batteries, and auxiliary power devices.

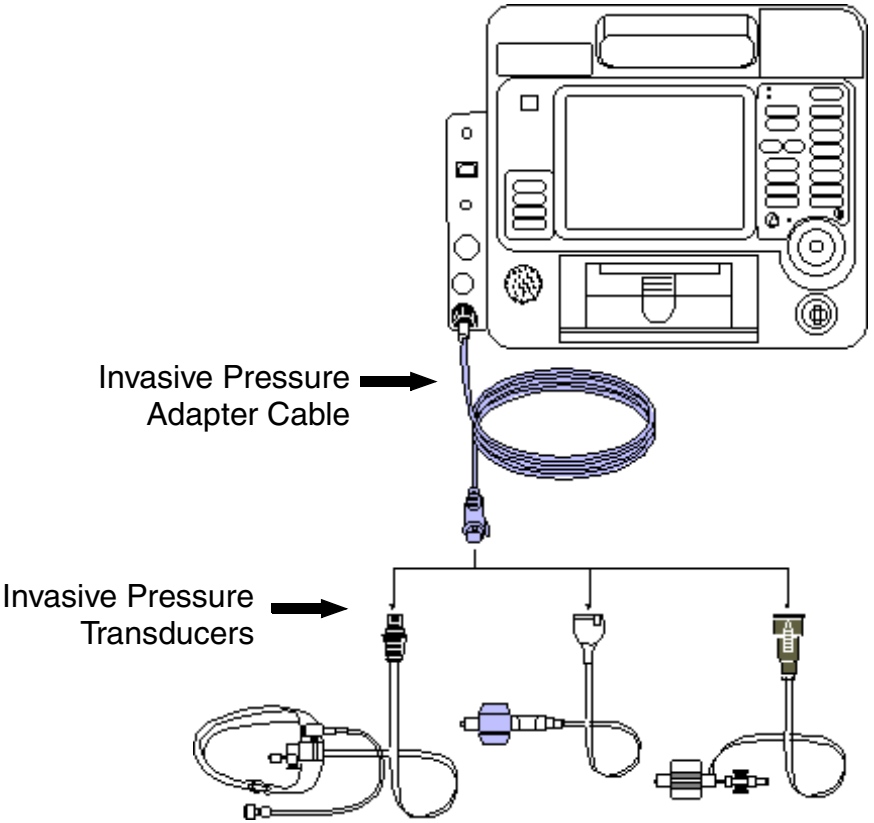


System Context Diagram

Front of Device—continued

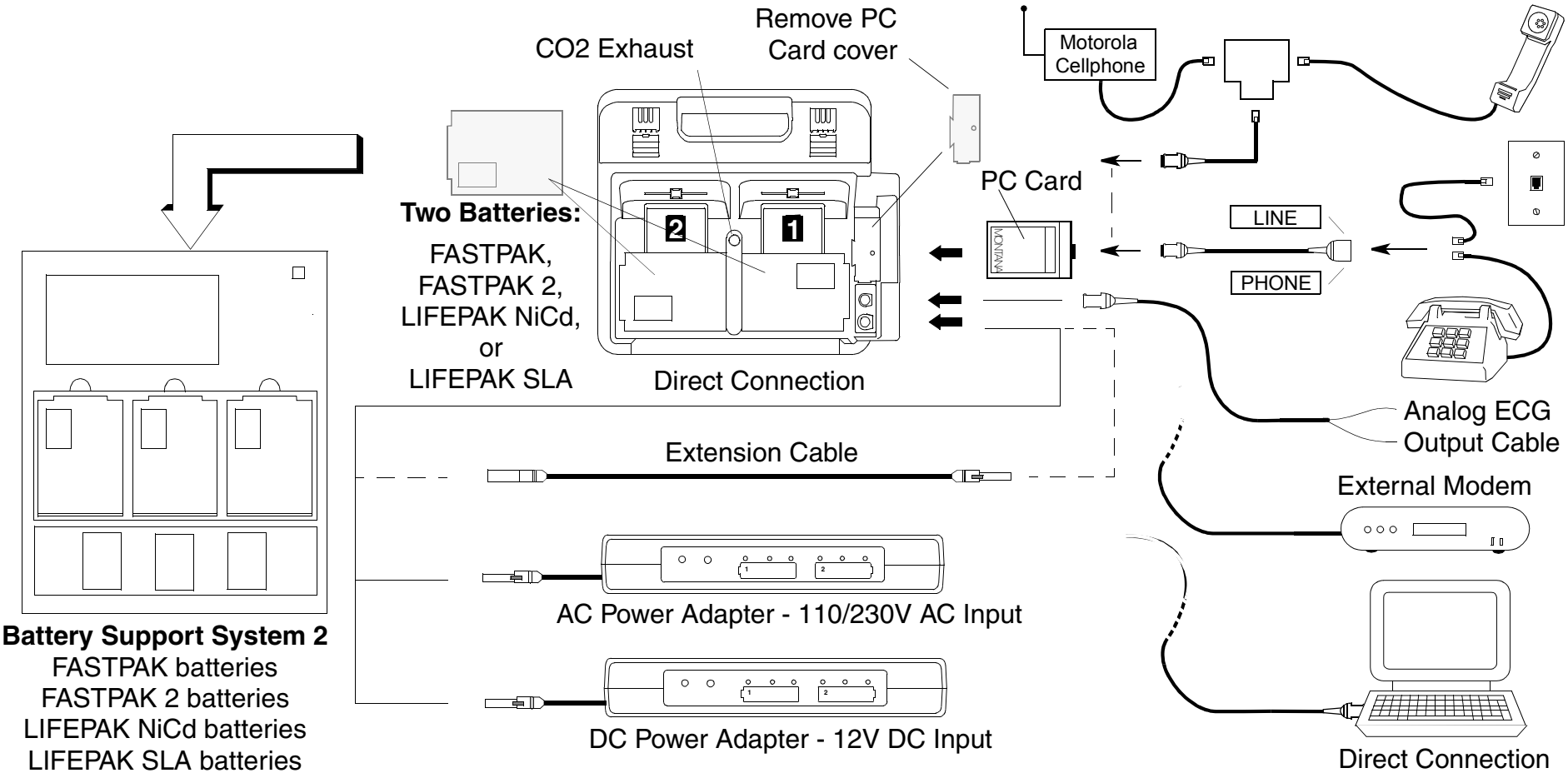
The system context diagram shows you how the device connects with invasive pressure devices.

Refer to the **LIFEPAK 12 defibrillator/monitor Operating Instructions — Maintaining the Equipment** for a complete listing of invasive pressure accessories



System Context Diagram

Back of Device



Functional Description

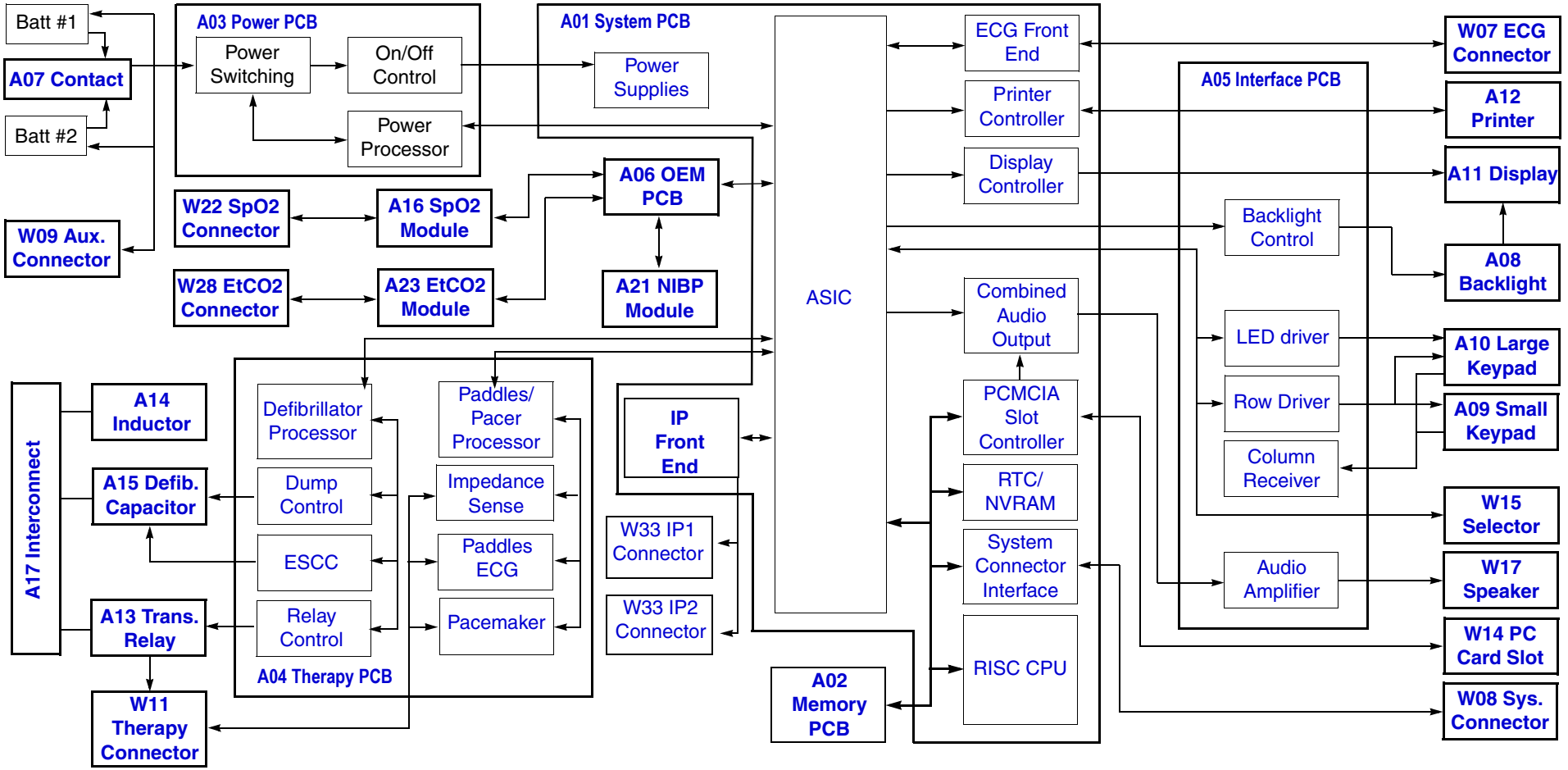
The LIFEPAK 12 defibrillator/monitor series is a platform medical device capable of combining a variety of therapeutic and monitoring features. In addition to manual defibrillation, semi-automatic defibrillation, and noninvasive pacing, the LIFEPAK 12 defibrillator/monitor offers optional oximetry, invasive pressure, noninvasive blood pressure, CO2, and 12-lead ECG monitoring. A key feature of the LIFEPAK 12 defibrillator/monitor is its ability to be upgraded as the needs of the customer change or as new monitoring modes become available. This portable device may be powered from any of three battery types or optional AC or DC Power Adapters.

The following functional description is intended to provide service personnel with a basic understanding of the LIFEPAK 12 defibrillator/monitor design. Its purpose is to assist the qualified technician in troubleshooting to the subassembly level. Troubleshooting below the subassembly level outside the factory is not recommended, nor is it within the scope of this Service Manual to provide the detail necessary to support such repairs.

Refer to the LIFEPAK 12 defibrillator/monitor **System Block Diagram** when necessary as you review the following description.

Functional Description

The System Block Diagram is linked to the corresponding descriptive text.



Functional Description

A01 System PCB

The A01 System PCB integrates and controls all functions of the LIFEPAK 12 defibrillator/monitor. There are two primary components: A 32-bit **Reduced Instruction Set Computer (RISC processor)**, which functions as the central processing unit (CPU) for intensive number processing tasks, and an **Application-Specific Integrated Circuit (ASIC)**, which operates as the interface between the CPU and all other device therapeutic, monitoring, data management, and display sub-systems.

The following discussion identifies major sub-systems of the A01 System PCB and their basic functions.

- **Power Supplies** — The A01 System PCB uses SW_VB (Switched Battery Voltage) from the A03 Power PCB (via the A04 Therapy PCB) to originate four power supplies for use throughout the device as follows:
  - +5 V logic power for use on the A01 System PCB within the PCMCIA, DUART, RTC, ASIC, and Audio sub-systems and the A04 Therapy PCB.
  - +3.3 V logic power for use on the A01 System PCB within the RISC CPU, DSP, Main Memory, and ASIC sub-systems.
  - ±12 V analog power for use on the A01 System PCB, A04 Therapy PCB, and for A11 LCD Assembly contrast.
  - +24 V power for use in the A01 System PCB Printer sub-system.

Functional Description

A01 System PCB (continued)

- **ECG Front End** — The LIFEPAK 12 defibrillator/monitor simultaneously captures inputs from up to 10 independent patient connected leads for use in the interpretive 12-lead algorithm and basic ECG waveform display. The ECG Front End performs the functions of patient isolation, electrostatic discharge and defibrillation protection, lead selection, baseline DC restore, bandwidth filtering, internal pacemaker detection, and ECG sampling via analog-to-digital conversion (ADC). Results from the ADC process pass across the isolation barrier to the A01 System PCB Digital Signal Processor (DSP) for filtering and signal conditioning before use by the RISC CPU. ECG input is through the parameter bezel W07 ECG Connector Cable.
- **IP Front End** — The Invasive Pressure (IP) circuitry processes the input signal from a disposable IP transducer through the IP input connectors on the LIFEPAK 12 defibrillator/monitor parameter bezel. Two input connectors are provided for simultaneous monitoring of two IP channels. The W33 Invasive Pressure Harness provides the connection from the parameter bezel to the A01 System PCB assembly, where the IP preamplifier circuitry is located.
  The IP preamplifier is isolated from the AC power ground by the ECG preamplifier iso-barrier. The transducer drive circuitry supplies a positive 2.5 V and a negative 2.5 V excitation voltage to the resistive bridge-type transducer. The output signal from the transducer is conditioned by a

Functional Description

A01 System PCB (continued)

low-pass filter at the input of an instrumentation amplifier, which amplifies the signal approximately 400 times. The signal is then multiplexed to the A-D converter, digitized, and then sent serially across the iso-barrier for DSP processing and display.

- **Printer Controller** — The LIFEPAK 12 defibrillator/monitor uses either a 50 millimeter (mm) or 100 mm thermal array printer. In either case, the A01 System PCB Printer Controller governs motor speed, adjusts print strobe pulse width, senses paper presence and door closure, senses printhead temperature, and provides the data to be printed. Printer fonts are stored in memory devices located on the A01 System PCB.
- **PCMCIA Slot Controller** — The LIFEPAK 12 defibrillator/monitor uses a PC Card (PCMCIA) modem for data transmission to external data management programs. All internal data exchange between the PC Card and the device is handled by the A01 System PCB PCMCIA Controller.

Functional Description

A01 System PCB (continued)

- **Real Time Clock/Non-Volatile RAM (RTC/NVRAM)** — The RTC/NVRAM maintains the date and time (year 2000 compatible), and provides storage for instrument user setups, device manufacturing configuration (a Medtronic Physio-Control proprietary file), and calibration data. The RTC/NVRAM is powered by a lithium coin cell battery.
- **System Connector Interface** — The LIFEPAK 12 defibrillator/monitor may be connected to external devices for the purposes of analog ECG signal output, data transmission, factory test, Medtronic Physio-Control field service data collection, and device configuration during field upgrade. Except for analog ECG signals, all data communications at the system connector are at RS-232 levels.

  The analog ECG signal output path consists of A01 System PCB components including a digital-to-analog converter (DAC), low-pass filter, and electrostatic discharge protection.

  The digital communications output path consists of two components: a dual universal asynchronous receiver/transmitter (DUART); and a level-shifter for the purposes of converting device internal logic levels to RS-232 levels.

Functional Description

A01 System PCB (continued)

- **Display Controller** (LCD Devices Only) — Data for display on the device A11 LCD Assembly originates from the A01 System PCB Display Controller made up of a portion of the ASIC and dedicated data driver/buffers. Display Controller hardware includes video RAM and LCD contrast control. Screen fonts are stored in memory devices located on the A01 System PCB.
- **Combined Audio Output** — Originates from either the A01 System PCB ASIC or a PCMCIA card installed in the card slot. System audio (voice prompts and alarm tones) from the ASIC returns to analog form in a A01 System PCB DAC. System audio combined with PCMCIA card audio is filtered and routed to the A05 Interface PCB **Audio Amplifier** for application to the W17 Speaker Assembly. Voice prompts are stored in memory devices located on the A01 System PCB.

A02 Memory PCB

LIFEPAK 12 defibrillator/monitor main operating system software and patient data management files are stored in flash (EEPROM) memory devices located on the A02 Memory PCB.

Functional Description

A03 Power PCB

The A03 Power PCB manages application of power to the LIFEPAK 12 defibrillator/monitor from available sources (either of the two batteries or an attached power adapter). Additional functions include power on/off control, “smart” battery communication, routing of battery charge currents, battery voltage measurement, over-current protection fusing, and serial communication of power status to the A01 System PCB.

A03 Power PCB operation centers around a power processor, which detects the presence of available power sources, selects a power source for use by the device, monitors their status (e.g., low battery, replace battery, removal from the device, etc.), and applies charging currents from an attached power adapter to the batteries.

When the LIFEPAK 12 defibrillator/monitor is off, closure of the device POWER control activates A03 Power PCB circuitry to alert the Power processor, which chooses the appropriate source to originate SW_VB (Switched Battery Voltage) power. SW_VB is then routed, in turn, to the A04 Therapy PCB and A01 System PCB for use, as is, and for further processing into system power supply voltages.

Closure of the POWER control when the LIFEPAK 12 defibrillator/monitor is on triggers an orderly device shutdown prior to turning off SW_VB.

Functional Description

A04 Therapy PCB

The A04 Therapy PCB maintains the patient interface for therapeutic purposes. In addition to developing defibrillation and noninvasive pacing energies, the A04 Therapy PCB ensures safe delivery of those energies, captures PADDLES ECG, and monitors attachment of the QUIK-COMBO electrodes.

The following discussion identifies major sub-systems of the A04 Therapy PCB and their basic functions.

- **Defibrillator Processor** — The Defibrillator Processor manages operation of the defibrillator energy storage and delivery functions using serial inputs from the A01 System PCB ASIC, hardware inputs from external paddles, and inputs from other A04 Therapy PCB circuitry. Status of the defibrillator sub-system is reported serially to the A01 System PCB ASIC.
- **Energy Storage Capacitor Charger (ESCC)** — Under control of the Defibrillator Processor, the ESCC converts COM_VB (Common Battery Voltage) to high-voltage for application to the Energy Storage Capacitor. Circuitry within the ESCC performs comparisons between stored energy and target energy to limit charging to the value selected by the user. Additional circuits compensate the ESCC for low battery voltage, provide over-voltage protection, and send divided capacitor high voltages to separate safety monitoring and energy display circuits.

Functional Description

A04 Therapy PCB (continued)

- **Transfer Relay Control** — To enable the transfer of defibrillation energy, the A04 Therapy PCB integrates control signals from the SHOCK control (or external paddles discharge controls), Defibrillator Processor, ESCC, and the A01 System PCB ASIC. The transfer relay will only be activated to deliver energy to the defibrillation electrodes when all conditions are satisfied in each system component.
- **Dump Relay Control** — A fail-safe system used to safely dissipate defibrillation energies from the Energy Storage Capacitor under a number of circumstances, e.g., change of energy selection, when power is removed, pacing is activated, QUIK-COMBO leads off, etc. With the exception of power removal, the Dump Relay Control system functions under the control of the System and/or Defibrillator processors.
- **QUIK-COMBO Leads Off (Impedance Sense/Motion Detection)** — The LIFEPAK 12 defibrillator/monitor activates leads off/motion detection when using QUIK-COMBO electrodes. For the purposes of this discussion, consider the leads off/motion detector and patient system as a simple voltage divider.

Functional Description

A04 Therapy PCB (continued)

Leads off/motion detection relies on two key characteristics: leads off/motion detector output impedance is relatively high (greater than 125 kΩ), and patient impedance is relatively low (typically less than 300 Ω). To exploit these characteristics the device injects an AC impedance drive signal through the QUIK-COMBO electrodes into the relatively low patient impedance and monitors the voltage drop across the patient. Minute perturbations sensed in the low-amplitude signal developed across the patient represent motion; gross changes in the sensed signal indicate electrode disconnection.

- **Paddles/QUIK-COMBO ECG Preamplifier** — The ECG Paddles/ QUIK-COMBO ECG Preamplifier performs the functions of patient isolation, electrostatic discharge and defibrillation protection, baseline DC restore, bandwidth filtering, internal pacemaker detection, and ECG sampling via analog-to-digital conversion (ADC). Results from the ADC process are fed to the **Paddles/Pacer Processor**.

Functional Description

A04 Therapy PCB (continued)

- **Paddles/Pacer Processor** — The Paddles/Pacer Processor controls all facets of noninvasive pacemaker operation and paddles ECG signal acquisition. Inputs received serially from the A01 System PCB ASIC are translated into controls to enable Noninvasive Pacemaker delivery of properly timed pacing impulses at the desired current. Analog ECG from the Paddles/QUIK-COMBO ECG Preamplifier is processed for local use and for transfer across the isolation barrier to the A01 System PCB DSP and onto the A01 System PCB ASIC.
- **Noninvasive Pacemaker** — The A04 Therapy PCB Noninvasive Pacemaker sub-system develops isolated, adjustable current, 20 millisecond (nominal), trapezoidal transchest pacing impulses. Major components of the Noninvasive Pacemaker include the Paddles/Pacer Processor, isolated low- and high-voltage power supplies, safety monitors, output current, pulse width, and pulse shape controls. Controls for, and status of, the Noninvasive Pacemaker pass serially between the Paddles/Pacer Processor and the A01 System PCB ASIC.

Functional Description

A04 Therapy PCB (Biphasic Devices Only)

A terminal assembly used to interconnect the A13 Transfer Relay Assembly, A14 Waveshaping Inductor, and A15 Energy Storage Capacitor. The bracket itself is strapped to the A15 Energy Storage Capacitor with a large cable tie.

A05 Interface PCB

The A05 Interface PCB is primarily a signal collector/distributor used to simplify the routing of cables between the front and rear halves of the LIFEPAK 12 defibrillator/monitor. The majority of signals from the device rear half are consolidated into the W04 System PCB/Interface PCB Cable and passed to the A05 Interface PCB for further distribution to front half components, e.g., A09 Small Keypad, A10 Large Keypad, A11 Display Assembly, and A12 Printer Assembly. The following active circuits reside upon the A05 Interface PCB:

- **Audio Amplifier — Combined Audio Output** signals receive final amplification in the A05 Interface PCB Audio Amplifier prior to application to the W17 Speaker Assembly.
- **LED Driver** — Most device LEDs (located on the A10 Large Keypad) receive their drive from a serial-to-parallel converter located on the A05 Interface PCB. The SERVICE LED drive originates from the A01 System PCB ASIC. The CHARGE and POWER LEDs receive their drive from the A03 Power PCB Power Processor.

Functional Description

A05 Interface PCB (continued)

- **Keypad Row Driver** — The A01 System PCB ASIC reads device control keys using a row and column address scheme, i.e., each key resides at a unique row and column address. Data from the ASIC shifts serially into the A05 Interface PCB Keypad Row Driver (a serial-to-parallel converter) for application to key rows in the A09 Small Keypad and A10 Large Keypad. A key closure enables row drive for a unique key to be sensed at the **Keypad Column Receiver**.
- **Keypad Column Receiver** — The A01 System PCB ASIC reads key closures serially from the Interface Keypad Column Receiver (a parallel-to-serial converter). In practice, closure of a device key passes **Row Drive** for that key to one, and only one, Column Receiver input.
- **LCD Backlight Control** (LCD Devices Only) — The A05 Interface PCB applies filtered SW_VB to the A08 Backlight PCB when it receives an enable (LCD_BL_ON) from the A01 System PCB Display Controller. A separate backlight power supply is mounted on a metal bracket in the front case.

Functional Description

A06 OEM PCB

A PCB used to integrate monitoring modes supplied to Medtronic Physio-Control by third parties, i.e., Original Equipment Manufacturers (OEM), into the LIFEPAK 12 defibrillator/monitor system architecture. The A06 OEM PCB provides isolated power supplies, safety isolation, transient protection, and signal interface adapters to support hosted OEM modules.

Note: The A06 OEM PCB is not installed unless one or more options are installed.

A07 Contact PCB

Interfaces the LIFEPAK SLA (Sealed Lead Acid) battery edge connector with the LIFEPAK 12 defibrillator/monitor. The signals associated with the edge connector, clock, data, and detect, are not currently used by the device.

A08 Backlight PCB (LCD Devices Only)

A printed circuit board that contains the circuitry to light the A11 LCD Assembly screen. The contrast adjustment is through a programmable power supply on the A01 System PCB.

Functional Description

A09 Small Keypad/ A10 Large Keypad

Common device controls (those not available using the Selector) are made through either the A09 Small Keypad and A10 Large Keypad. The number of keys on these keypads varies depending upon the features installed in a specific device. All keys with the exception of POWER and SHOCK are addressed by the User Controls section of the A01 System PCB ASIC.

- The POWER control remains separate from the addressed keys because it is needed to activate and deactivate the device without ASIC interaction. Closures of the POWER control are applied to the A03 Power PCB On/Off Control block.
- The SHOCK control remains separate from the addressed keys as a matter of fail-safe design, thus preventing inappropriate activation under conditions of CPU run-away. Operator-initiated closures of the SHOCK control are applied in two places: the A01 System PCB ASIC and the A04 Therapy PCB Defibrillator Processor. The ultimate shock decision rests with both the ASIC and Defibrillator Processor being in agreement that it is appropriate to deliver defibrillation energy.

A11 LCD Assembly (Alternative to A11 EL Display Assembly)

A backlit 640 × 480 pixel LCD that displays the primary ECG waveforms (and secondary waveforms in devices with 100 mm printers) and text messages.

Functional Description

A11 EL Display Assembly (Alternative to A11 LCD Assembly)	A high-resolution electroluminescent (EL) display for use in environments with bright or variable ambient light and the requirement for a wide range of viewing angles.
A12 Printer Assembly	The LIFEPAK 12 defibrillator/monitor uses one of two printers: the 50mm printer is used whenever the 12-lead ECG monitoring capability is absent; the 100mm printer is installed to support 12-lead ECG monitoring.
A13 Transfer Relay	A gas-filled, high-voltage relay mounted in the rear case that routes current from the A15 Energy Storage Capacitor (via the A14 Waveshaping Inductor) through the W11 Therapy Connector Cable to the patient. Activation of the A13 Transfer Relay is governed by the A04 Therapy PCB **Transfer Relay Control** block.
A14 Waveshaping Inductor (Edmark Devices Only)	An inductor used to modify the A15 Energy Storage Capacitor waveform into the Edmark defibrillation waveform. Terminals connect with the A17 Interconnect Bracket.
A14 Inductive Resistor (Biphasic Devices Only)	A resistor that conditions the Energy Storage Capacitor output for the wave generator/regulator circuit on the biphasic board.

Functional Description

A15 Energy Storage Capacitor (Edmark Devices Only)	A metallized film capacitor used for energy storage. The capacitance of the A15 Energy Storage Capacitor is calculated when you run the **TCP – Defibrillation Calibration** procedure and the value is displayed as part of the **Service/Status/ Device Log** screen. The nominal value is 50 µF.
A15 Energy Storage Capacitor (Biphasic Devices Only)	A metallized film capacitor used for energy storage. The capacitance of the A15 Energy Storage Capacitor is calculated when you run the **TCP – Defibrillation Calibration** procedure and the value is displayed as part of the **Service/Status/ Device Log** screen. The nominal value is 195 µF.
A16 SpO2 Module	An OEM MP-205 oximetry module is supplied by Nellcor Puritan Bennett. This patented module performs all functions related to oxygen saturation measurement, including sensor drive. Measurement results pass serially via the A06 OEM PCB to the A01 System PCB ASIC for display.
A17 Interconnect Bracket	A terminal assembly used to interconnect the A13 Transfer Relay Assembly, A14 Waveshaping Inductor, and A15 Energy Storage Capacitor. The bracket itself is strapped to the A15 Energy Storage Capacitor with a large cable tie.

Functional Description

A21 NIBP Module	An OEM NIBP monitor is supplied by CAS Medical Systems. This module performs blood pressure monitoring, determining systolic and diastolic pressures and pulse rate. Measurement results pass serially via the A06 OEM PCB to the A01 System PCB ASIC for display. Readings may be taken one time or on a recurring interval.
A22 Biphasic PCB (Biphasic Devices Only)	A circuit board that generates the biphasic waveform.
A23 EtCO2 Module	An OEM capnometry module is supplied by Oridion Medical Ltd. This module continuously monitors end tidal carbon dioxide (EtCO2) and respiratory rate. Measurement results pass serially via the A06 OEM PCB to the A01 System PCB ASIC for display.
W07 ECG Connector Cable	A front panel connector used for attaching a 3-lead or 12-lead ECG cable. Signal processing takes place on the A01 System PCB **ECG Front End** processing circuitry.
W08 System Connector Cable	A rear panel connection used for the exchange of digital information with an external modem, personal computer, factory test systems, or Medtronic Physio-Control field service test systems. The system connector also supplies a real-time analog ECG signal for use in basic central monitoring or telemetry systems.

Functional Description

W09 Auxiliary Connector Cable

A rear panel access port used for connection of AC or DC Power Adapters.

W11 Therapy Connector Cable

A patient connection port used for delivery of either defibrillation or pacing therapeutic energies. The therapy connector allows attachment of all available electrode accessories, including QUIK-COMBO pacing/defibrillation/ECG electrodes, adult external paddles, and internal paddles with discharge control.

Note: Some therapeutic accessories such as pediatric or posterior paddle attachments connect to the device via accessories mentioned above.

The LIFEPAK 12 defibrillator/monitor uses varying jumper configurations within attached accessories to determine the type of accessory connected. Discriminator circuitry within the A04 Therapy PCB **Defibrillator Processor** sub-system decodes the accessory jumper configurations.

W15 Selector Assembly

A rotary optical pulse-code modulator used to navigate through and select specific items from the LIFEPAK 12 defibrillator/monitor menu system. Detent points within the Selector provide tactile feedback to the user. When the desired item has been highlighted on the display, the user pushes the Selector knob to enter their selection. The Selector forms part of the User Controls and Indicators block. Pulses derived from the W15 Selector Assembly pass serially to the User Controls portion of A01 System PCB **ASIC**.

Functional Description

W17 Speaker Assembly	Used to annunciate device warnings, alarms, tones, and in Advisory Mode, voice prompts. Drive for the W17 Speaker Assembly originates in the A01 System PCB **Combined Audio Output** block. Final amplification occurs in the A05 Interface PCB **Audio Amplifier**.
W22 SpO2 Connector Cable	A front panel connector on the parameter bezel used for attaching a NELLCOR SpO2 (Oximeter) sensor.
W28 CO2 Connector Assembly	A front panel connector used for attaching a CO2 Filterline. Signal processing takes place on the CO2 module.
W33 IP Connector Cable	A front panel connector used for attaching invasive pressure transducers.

Operating Instructions

The LIFEPAK 12 defibrillator/monitor series Operating Instructions familiarize the operator with basic device functions and identify controls, indicators, and connectors. Qualified service personnel must consult both the LIFEPAK 12 defibrillator/monitor series Operating Instructions and this Service Manual for a complete understanding of the use and maintenance of the device.

WARNINGS!

Possible improper device performance. Use only Medtronic Physio-Control QUIK-COMBO or FAST-PATCH electrodes and batteries described in this Service Manual. Substitution of non-Medtronic Physio-Control electrodes or batteries may cause the device to operate improperly.

Possible defibrillator shutdown. Always have access to spare, fully charged, properly maintained batteries. Immediately replace a battery when the device displays a depleted battery icon or when a LOW BATTERY **or** REPLACE BATTERY **warning message appears.**

Possible loss of power during patient care. Using improperly maintained batteries to power the LIFEPAK 12 defibrillator/monitor may cause premature power loss. Use the Battery Support System 2 (FASTPAK, FASTPAK 2, LIFEPAK NiCd, or LIFEPAK SLA batteries) to maintain and charge your device batteries.

Operating Instructions

Use the following links to the LIFEPAK 12 defibrillator/monitor series Operating Instructions for operating procedures and related information.

- **Preface**
  - About Automated External Defibrillation
  - About Defibrillation Therapy
  - About Noninvasive Pacing
  - About 12-lead Electrocardiography
  - About SpO2 Monitoring
  - About NIBP Monitoring
  - About EtCO2 Monitoring
  - About IP Monitoring
  - Text Conventions
- **Safety Information**
  - Terms
  - General Warnings and Cautions
  - Symbols
  - Declaration of Conformity

Operating Instructions

- **Basic Orientation**
  - Introduction
  - Unpacking and Inspecting
  - Controls, Indicators, and Connectors
  - Connecting to Power
- **Monitoring**
  - Monitoring the ECG
  - Acquiring a 12-lead ECG
  - Monitoring SpO2
  - Monitoring EtCO2
  - Monitoring NIBP
  - Monitoring IP
- **Therapy**
  - General Therapy Warnings and Cautions
  - Therapy Electrode and Standard Paddle Placement
  - Automated External Defibrillation
  - Manual Defibrillation
  - Noninvasive Pacing

Operating Instructions

- **Paddle Accessory Options**
  - Therapy Electrodes
  - Pediatric Paddles
  - Posterior Defibrillation Paddle
  - External Sterilizable Paddles
  - Internal Handles with Discharge Control
  - Sterilization Guidelines
- **Data Management**
  - Overview of Data Storage and Retrieval
  - Retrieving CODE SUMMARY Critical Event Record
  - Patient Record
  - Equipment Connections for Data Transmission
- **AC and DC Power Adapters**
  - Basic Orientation
  - Using the AC or DC Power Adapters
  - General Maintenance

Operating Instructions

- **Maintaining the Equipment**
  - General Maintenance and Testing
  - Battery Maintenance
  - General Troubleshooting Tips
  - Service and Repair
  - Product Recycling Information
  - Warranty
  - Accessories, Supplies, and Training Tools
- **Defining Setup Options**
  - Setup Options
  - Entering Setup Options
  - Setup Menus
  - Entering Telephone Number and Prefix Characters
  - Entering Initialization Strings
- **Appendix A Specifications and Performance Characteristics**
- **Appendix B Screen Messages**
- **Appendix C Operator's Checklist**
- **Appendix D Shock Advisory System**
- **Appendix E Inservice Mode**
- **Appendix F International Transmit Connections**

Modes of Operation

When the LIFEPAK 12 defibrillator/monitor is on, it is always in one of five Modes of Operation. Choose from the following links to learn more about a particular operating mode.

Manual Mode

Automated External Defibrillator (AED) Mode

Setup Mode

Inservice Mode

Service Mode

Manual Mode

About Manual Mode and Entering Manual Mode

To enter Manual Mode, turn on the device and observe the ADVISORY indicator. If the ADVISORY indicator is off, you are in Manual Mode. If the ADVISORY indicator is on, then press the ADVISORY control to enter Manual Mode. The factory default response allows you direct access to Manual Mode. Other responses are: to confirm your action; to enter a Manual Mode passcode; or to deny Manual Mode access altogether (restricted). The response choice is selected in the Manual Mode portion of the **Setup Mode**.

Mode/Response When Turned On	Response Description
Manual/Direct (default)	Turn on in Manual; direct access between Advisory and Manual Modes
AED/Direct	Turn on in AED; direct access between Advisory and Manual Modes
AED/Confirm Once	Turn on in AED; operator confirms Manual Mode selection once
AED/Confirm Always	Turn on in AED; operator confirms Manual Mode selection every time
AED/Passcode Once	Turn on in AED; operator enters Manual Mode passcode once
AED/Passcode Always	Turn on in AED; operator enters Manual Mode passcode every time
AED/Restricted	Turn on in AED; no access to Manual Mode

Automated External Defibrillator (AED) Mode

About AED Mode

To enter Automated External Defibrillator (AED) Mode, turn on the device and observe the ADVISORY indicator. If the ADVISORY indicator is on, you are in AED Mode.

If the ADVISORY indicator is off, press the ADVISORY control to enter AED Mode. There are no restrictions when going from Manual Mode to AED Mode.

To continue, see the **Operating Instructions — Therapy**

Setup Mode

About Setup Mode

The operating defaults for the device are configured while you are in Setup Mode. Options include general characteristics, Manual Mode and AED Mode operating characteristics, alarms setup, transmission sites, time-of-day clock, and many other items. After the setup is complete, turn off the device, which saves the configuration. The next time the device is turned on, the operating defaults you selected are active.

The information that follows, with references to the Operating Instructions, shows you the options available in the Setup Mode. There is also a Factory Reset option that resets the device to the factory default settings, except for transmission sites, output ports, initialization strings, and the maintenance interval, which remain unchanged.

Saving the Setup Configuration

If the owner of the device has a setup configuration that cannot be disturbed, you have two choices to preserve this setup. The first method is to **print the setup configuration.** When service is complete, you can verify the setup and then manually reset the configuration.

Setup Mode

The second method is to **send the setup configuration** to another LIFEPAK 12 defibrillator/monitor. After service is complete, transfer the configuration back to the device.

Note: Saving the configuration with the **Transfer and Save Setup Procedure** requires that the software in the device being used for storage of configuration information is of the same revision. Otherwise potentially unexpected results may occur once the configuration has been restored to the repaired device.

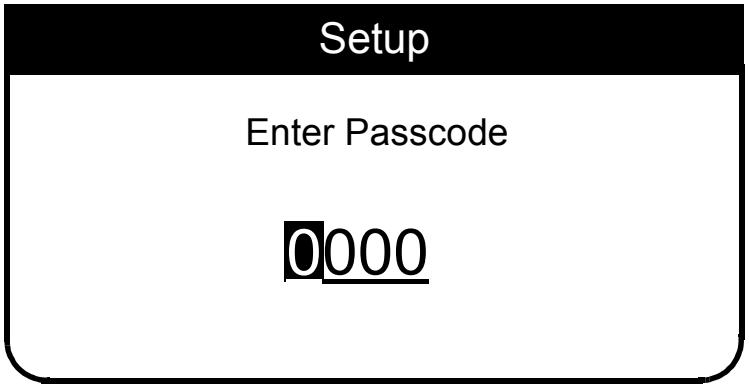
Note: When using the **Transfer and Save Setup Procedure**, if the two devices are of different energy configurations (not both Edmark or both biphasic), the configuration information for default energy must be verified and, if required, restored manually.

Setup Mode

Entering Setup Mode

To enter Setup Mode:

1. Hold down both the OPTIONS and EVENT keys, then turn on the device. Continue holding until the SETUP PASSCODE screen overlay appears.

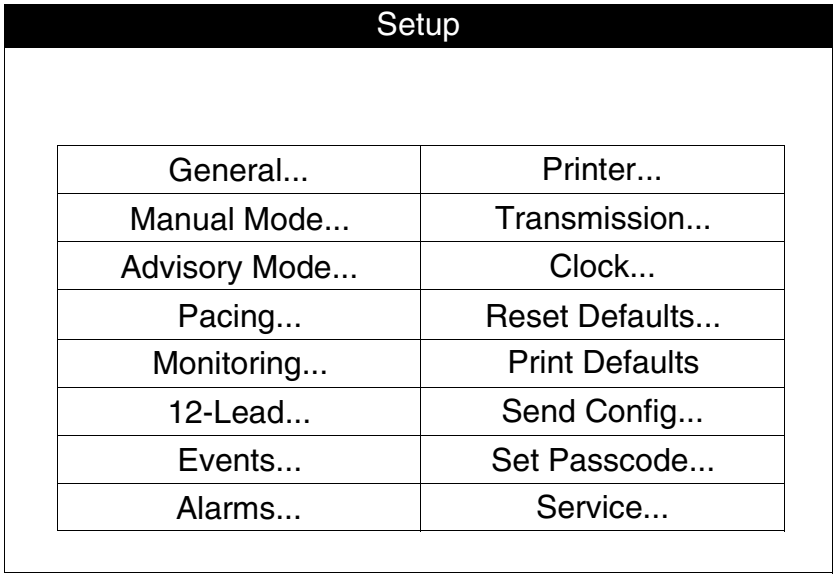


2. The factory default is 0000; the reserved technician passcode is 5433. To enter the passcode, rotate the Selector to select a digit, then press the Selector to continue. After the last digit is entered, the SETUP menu appears.

Setup Mode

Entering Setup Mode (continued)

3. Rotate the Selector to select a setup category, then press the Selector to display the category overlay.



4. To print the current device setup configuration, select PRINT DEFAULTS. To send the setup configuration to another device, select SEND CONFIG...

5. To enter Service Mode, continue to **Entering Service Mode**.

6. To continue, see **Defining Setup Options** in the Operating Instructions.

Inservice Mode

About Inservice Mode

Inservice Mode allows you to practice or demonstrate the monitoring functions of the LIFEPAK 12 defibrillator/monitor. This includes:

- ECG lead selection
- SpO2
- EtCO2
- NIBP
- IP 1
- IP 2
- Trend
- Alarms
- Events

Entering Inservice Mode

To enter Inservice Mode:

1. Remove all front panel cables from the device (Therapy, ECG, and so on). You cannot enter Inservice Mode if any front panel cable is attached.
2. Hold down both the EVENT and HOME SCREEN keys, then turn on the device. Continue holding until the Inservice Mode message appears at the bottom of the display screen.
3. To continue, see the **Operating Instructions — Inservice Mode**.

Service Mode

About Service Mode

The Service Mode functions allow qualified service personnel to:

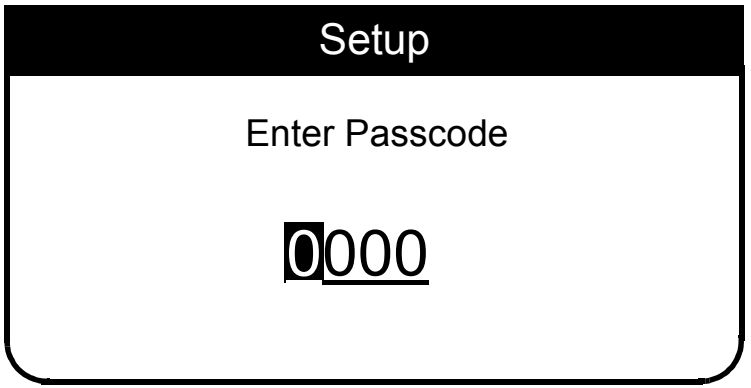
- Perform device calibration routines:
  - Defibrillation calibration
  - Pacing calibration
  - Printer calibration
  - CO2 calibration
  - NIBP calibration
  - Invasive Pressure
- Perform device tests:
  - Buttons test
  - Contrast test
  - Pixels test
  - Printer test
  - Voice/Tone test
- View the device status registers:
  - Device Log status
  - Error Log status
  - Counters status
  - Clear Memory
- Set the Service Mode Passcode
- Set the Maintenance Prompt Interval

Service Mode

Entering Service Mode

To enter Service Mode:

1. Hold down both the OPTIONS and EVENT keys, then turn on the device. Continue holding until the SETUP Passcode screen overlay appears.

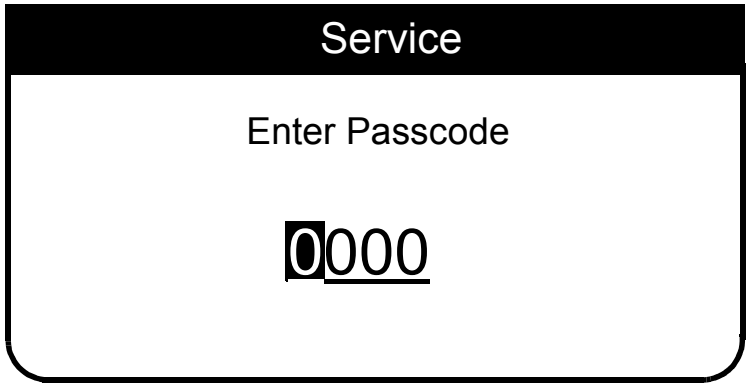


2. The factory default is 0000; the reserved technician passcode is 5433. To enter the passcode, rotate the Selector to select a digit, then press the Selector to continue. After the last digit is entered, the SETUP menu appears.

Service Mode

Entering Service Mode (continued)

3. Rotate the Selector to select SERVICE on the SETUP menu, then press the Selector. The SERVICE Passcode screen overlay appears.

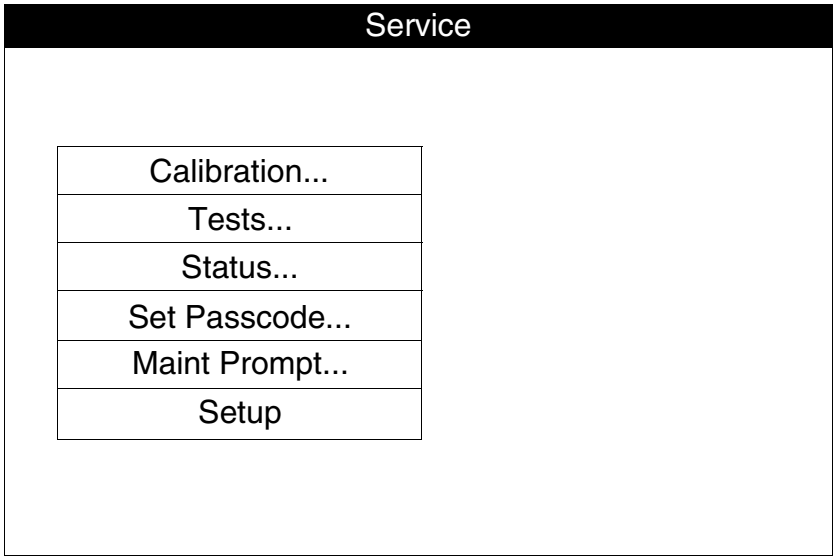


4. The factory default is 0000; the reserved technician passcode is 5433. To enter the passcode, rotate the Selector to select a digit, then press the Selector to continue. After the last digit is entered, the SERVICE menu appears.

Service Mode

Entering Service Mode (continued)

5. Rotate the Selector to select a service category, then press the Selector to display the category overlay.



Calibration — See **Test and Calibration Procedures (TCP)**

Tests — See **Performance Inspection Procedures (PIP)**

Status — See **Troubleshooting**

Set Passcode — Allows the user to set a Service Mode passcode

Maint Prompt — See **Preventive Maintenance**

Performance Inspection Procedures

The Performance Inspection Procedures (PIP) are a set of manual test procedures used for an operational closed-case evaluation of the LIFEPAK 12 defibrillator/monitor. This section describes the test procedures you will perform to determine if the LIFEPAK 12 defibrillator/monitor is operating within the required specifications. Investigate and correct any malfunctions or out-of-tolerance conditions detected during the PIP.

The PIP comprises safety and performance tests recommended by AHA/ASHE (American Hospital Association/American Society for Hospital Engineering) *Maintenance Management for Medical Equipment* and International Electrotechnical Commission (IEC) Technical Report 1288-2, *Maintenance of Cardiac Defibrillators-Monitors*.

Perform the PIP as part of a regularly scheduled preventive maintenance routine. Also, perform the PIP after any repair, replacement, or calibration procedure. Print the **PIP Checklist** to record the test results. Also refer to the **Operator Checklist** for additional items.

PIP – Scope and Applicability
PIP – Resource Requirements
PIP – Test Equipment Requirements
PIP – Instructions
PIP – Summary of Leakage Current Specifications

Performance Inspection Procedures (continued)

PIP – LP12 Maintenance Instruction
PIP – Power Adapters
PIP – Voice Recorder Accessory
PIP – Checklist

PIP – Scope and Applicability

The PIP applies to the LIFEPAK 12 defibrillator/monitor only. To complete the PIP, you perform the manual tests outlined in the **PIP – Instructions** section of this Service Manual. All PIP tests applicable to the LIFEPAK 12 defibrillator/monitor configuration under test must be performed from start to finish in the order presented.

Refer to the **PIP – Resource Requirements** for a listing of the necessary qualifications for PIP equipment, test equipment verification, workstation power, and personnel.

Refer to the **PIP – Test Equipment Requirements** for a listing of test equipment, including specifications, required to complete the PIP.

You can print the **PIP – Checklist** and use it to record your results.

PIP – Resource Requirements

This section describes the requirements for PIP equipment, PIP test equipment verification, PIP workstation power, and PIP personnel.

PIP – Equipment

To perform the PIP, you must use the equipment listed in the **PIP – Test Equipment Requirements** table. Although the table lists specific test equipment by manufacturer, test equipment with equivalent specifications may be substituted.

PIP – Test Equipment Verification

All test equipment used to perform the PIP must have a current calibration label, issued by a certified calibration facility.

PIP – Workstation Power

The ac line power to the workstation used must be connected to a grounded power source. The workstation must have Electrostatic Discharge (ESD) protection.

PIP – Personnel

Technicians who perform the PIP must be properly qualified and thoroughly familiar with the operation of the LIFEPAK 12 defibrillator/monitor, meeting the requirements described in **Service Personnel Qualifications**.

PIP – Test Equipment Requirements

The following is a list of test equipment required to conduct the PIP.

Equipment	Specifications	Manufacturer
Defibrillator Analyzer[1]	Energy range: 0 to 450 J Load resistance: 50 Ω ±1% Accuracy: ±2% +2 J Waveforms: NSR, VF, and Sine Wave	BIO-TEK® QED-6™, with test posts accessory (Software Version 2.07, or greater)
Patient Simulator[2]	Simultaneous 12-lead output Rates: 30 bpm, 120 bpm @ 1 mv Rate accuracy: ±1%, Blood Pressure accuracy ±1% full scale, ±1 MMHg	Dynatech Nevada 215A/217A
Safety Analyzer	110 or 220 Vac line voltage Current range: 0-1999 μA Current accuracy: 5% of reading or 1 digit (whichever is greater)	Dale Model 600 (120 vac line input) or 600E (240 vac line input)
Decade Resistance Box	0 to 9 MΩ resistance box Resolution: 1 Ω; Accuracy: ±1%	IET RS-200 Resistance Substituter
Analog ECG Output Cable	Connects to the System Connector	Medtronic Physio-Control PN 3010484

1. Some energy meters are not accurate for biphasic waveforms; contact your defibrillator analyzer's manufacturer for more information.
2. The patient simulator used for blood pressure verification must be accurate to ±2%. The specifications in this procedure may not be met by a simulator with lesser accuracy.

PIP – Test Equipment Requirements

Equipment	Specifications	Manufacturer
QUIK-COMBO test post adapter	Connects to QUIK-COMBO Therapy Cable	Medtronic Physio-Control PN 3005302
AC Power Adapter	Input power: 120/230 vac, 50/60 Hz	Medtronic Physio-Control PN 3010942
Stop Watch	Elapsed timer (minutes, seconds)	ACCUSPLIT 705X
FASTPAK Battery	NiCd battery	Medtronic Physio-Control PN 09-10424
FASTPAK 2 Battery	NiCd battery with fuel gauge	Medtronic Physio-Control PN 3009375
3-Lead ECG cable	Supplied with every device	Medtronic Physio-Control PN 3006218
12-Lead ECG cable	Includes main cable, limb lead attachment, and precordial lead attachment	Medtronic Physio-Control PN 805265
General purpose oscilloscope	Bandwidth: dc to 2 MHz Vertical accuracy: ±3% (5 mV – 5 v/div.) Horizontal Time Base Accuracy: ±5%	Tektronix® 2232 or equivalent

PIP – Test Equipment Requirements

Equipment	Specifications	Manufacturer
LIFEPAK NiCd Battery	NiCd battery with fuel gauge	Medtronic Physio-Control PN 3009376-00
LIFEPAK SLA Battery		Medtronic Physio-Control PN 3009378-03
Oximeter Sensor	Adult finger sensor – DS100A	Medtronic Physio-Control PN 3009086-03
NIBP Calibration Kit w/ Syringe		Medtronic Physio-Control PN 3012432-01
12 ft. Pressure Hose		Medtronic Physio-Control PN 3009167-013
Pressure/Vacuum Meter	1% Accuracy for pressure and vacuum	DNI Nevada 207B or equivalent
Invasive Pressure Cable	Note: Cable is provided with simulator	Fogg Systems

PIP – Test Equipment Requirements

Equipment	Specifications	Manufacturer
CO2 Calibration Kit		Medtronic Physio-Control PN 3012430-01
Calibration Gas	5% CO2, bal. N2	Medtronic Physio-Control PN 3012556-001
CO2 FilterLine		Medtronic Physio-Control PN XS-04666
CO2 Leak Test Fixture		Medtronic Physio-Control PN 3012430-00
DB-9 Extender Cable	9-pin D-connector; male/female	Medtronic Physio-Control PN 3009086-01 SPC DSCA-926MF-6 or Nellcor Puritan Bennett EC-4
DB-9 T Adapter Box	T-tap for a feedthrough DB-9 male-female connection	Black Box® FA148A (call 724.746.5500)
ECG 12-Lead Switch Box	Input the 10 connections from an ECG 12-Lead cable, and select any or all leads	Dale SW 14 Switch Box

PIP – Test Equipment Requirements

Equipment	Specifications	Manufacturer
Modem PC Card	3Com® Megahertz® 56, with adapter cable	Medtronic Physio-Control PN 3010294-004
	3Com Megahertz 33.6, with adapter cable	Medtronic Physio-Control PN 3010294-002
	Motorola® Montana 33.6, with adapter cable	Medtronic Physio-Control PN 3010294-001
QUIK-COMBO Electrode Cable		Medtronic Physio-Control PN 3006570
Standard Paddles		Medtronic Physio-Control PN 3006228
Safety Analyzer Test Lead	ECG Snap Connector to DB-9 Male (pin 3)	Fabricate from available parts

PIP – Instructions

PIP – General Instructions

This section lists the general instructions for performing the Performance Inspection Procedure (PIP).

- Perform the PIP in the presented order.
- Always start the PIP from the beginning of the procedure.
- Print the **PIP Checklist** and record your results.

See **Troubleshooting** to correct failures, then repeat the PIP.

PIP – Exterior Physical Inspection

To perform an exterior physical inspection:

Note: Throughout the body of this PIP, the LIFEPAK 12 defibrillator/monitor is referred to as the Unit Under Test, or UUT.

1. Inspect the UUT exterior for the following:
   - Damage
   - Excessive wear
   - Improper mechanical function
   - Damaged connectors
2. Pick up and turn over the UUT and listen for loose or rattling hardware. Locate any loose or rattling hardware and tighten or replace it.

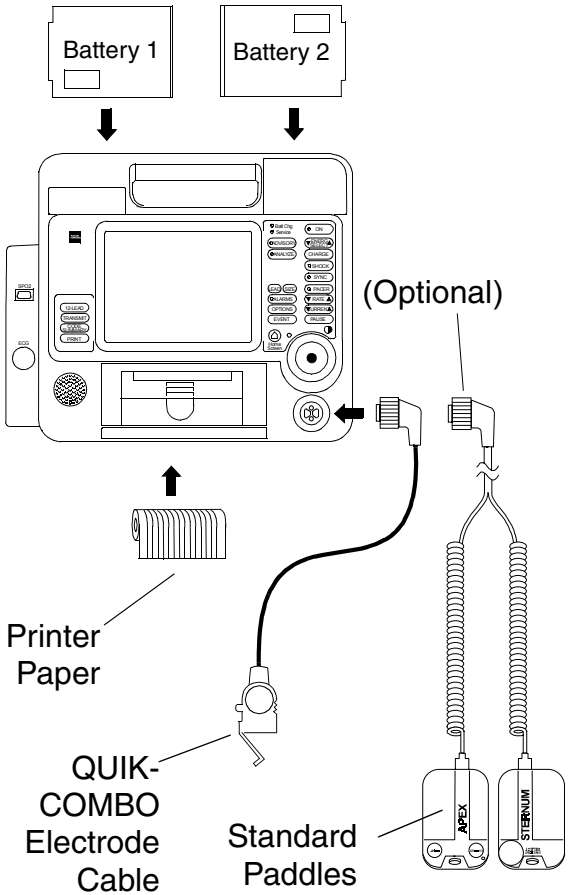
PIP – Instructions

PIP – Exterior Physical Inspection (continued)

3. Inspect the rubber feet on the underside of the lower enclosure. Reinstall or replace rubber feet as necessary.
4. Inspect the battery connector pins for the following:
   - Tighten loose pins.
   - Examine each leaf on the connector pins to make sure it is not cracked or broken.
   - Replace bent, broken, corroded, worn, or damaged pins using the **Battery Pin Replacement** procedure.
5. Inspect the Therapy, ECG, SpO2 (if equipped), CO2, NIBP, Power, and System connectors for damage, cracks, or contamination.
6. Inspect the keypads and overlays for damage, cracks, or separations.
7. Check all accessory cables, paddles, SpO2 sensors, CO2 tubing, NIBP tubing, and related items for expiration dates, general condition, and suitability for use.
8. Inspect carrying strap and mounts (if the UUT is equipped with them).
9. Record the results on the **PIP Checklist**.

PIP – Instructions

PIP – Setup



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WARNING!

Shock hazard. The UUT discharges up to 360 J of electrical energy through the defibrillator cable. You must safely discharge this electrical energy as described in this PIP. Do not attempt to perform this procedure unless you are thoroughly familiar with the operation of the UUT.

Set up the UUT in preparation for the PIP:

1. Insert two fully functional batteries into the UUT. A functional battery is one that does not return a LOW BATTERY message after turning on the device.
2. Verify that each battery clicks into position in the battery wells.
3. Install a roll of paper into the printer. Use 50 mm or 100 mm paper, whichever is appropriate for the UUT.
4. Connect the QUIK-COMBO electrode cable (or optional Standard Paddles) to the Therapy Connector.

   Note: If the UUT is outfitted with Standard Paddles, follow those PIP tests specific to Standard Paddles instead of the tests specific to QUIK-COMBO.

PIP – Instructions

PIP – Setup (continued)

Set up the UUT for Manual Mode access:

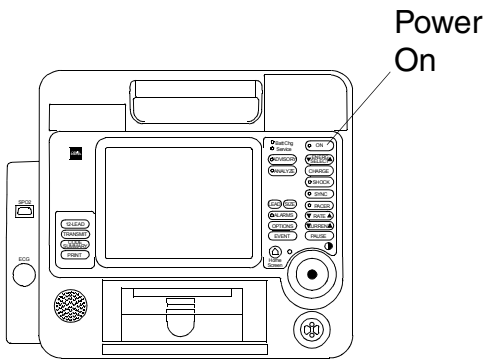
Note: It is most convenient if the UUT is set up for Manual Mode when performing the PIP. Follow the MANUAL ACCESS directions given in the **Operating Instructions – Defining Setup Options** section to set the UUT to turn on in MANUAL/DIRECT mode. If you do not wish to change the setup for a UUT configured with MANUAL ACCESS restrictions, it may be necessary to use the reserved technician passcode of **5433** to gain access to Manual Mode.

Note: Be sure to restore the UUT to the user selected MANUAL ACCESS mode at the completion of this PIP.

1. Enter the **Setup** mode.
2. Select the MANUAL MODE… menu option.
3. Select the MANUAL ACCESS option from the MANUAL MODE… sub-menu.
4. Record the user-selected manual access choice (e.g., MANUAL/DIRECT, AED/CONFIRM ONCE, AED/RESTRICTED, etc.) on the **PIP Checklist**.
5. Turn off the UUT.
6. Continue directly to the next test.

PIP – Instructions

PIP – Power On/ Self-Test



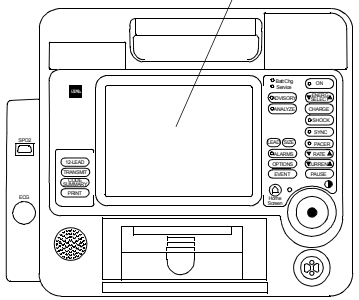
To perform the PIP Power On/Self-Test:

1. Press ON to initiate the UUT nominal 5-second power-on self-test routine.
2. Verify the display lights. The initial display includes the words SELF TESTS IN PROGRESS... and the software version number.
3. Record the software version in the **PIP Checklist**, e.g., 3011371-030.
4. Verify that all front panel indicators flash on (except the ON indicator, which glows steadily) for approximately 0.5 seconds during the self-test.
5. Verify that the speaker emits a clear, single beep test tone.
6. Verify that the power ON indicator remains lit after self test.
7. Verify that the BATT CHG indicator is off. This indicator is on only when a power adapter is powering the device.
8. Verify that the SERVICE indicator is off.

PIP – Instructions

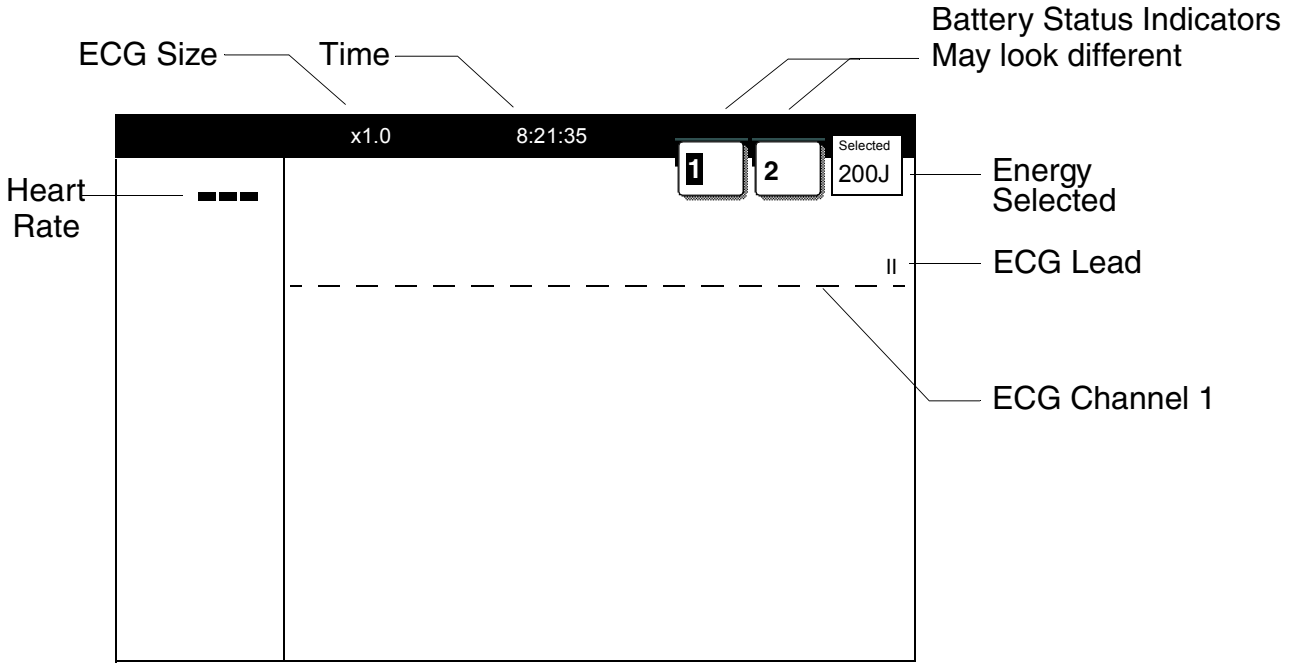
PIP – Power On/ Self-Test (continued)

Display Screen



9. Verify the display screen appears similar to that shown below.

Note: (LCD only) To adjust the LCD contrast, press the contrast control ◐, rotate the Selector to the desired contrast, then press the Selector.

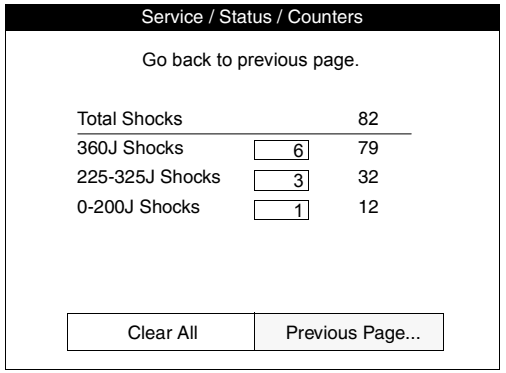


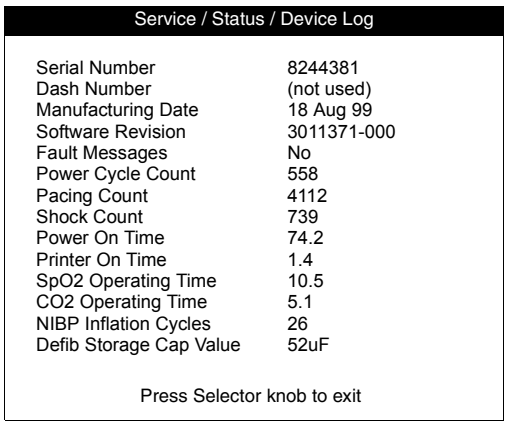
10. Turn off the device.

11. Record the results on the **PIP Checklist**.

PIP – Instructions

PIP – Record Operating Data



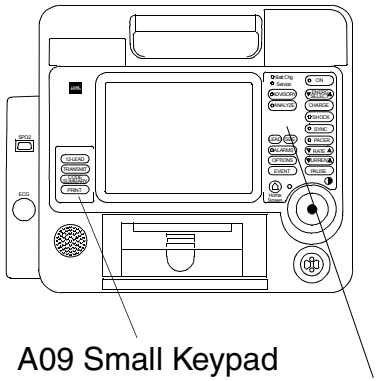

Service / Status / Device Log
Serial Number 8244381
Dash Number (not used)
Manufacturing Date 18 Aug 99
Software Revision 3011371-000
Fault Messages No
Power Cycle Count 558
Pacing Count 4112
Shock Count 739
Power On Time 74.2
Printer On Time 1.4
SpO2 Operating Time 10.5
CO2 Operating Time 5.1
NIBP Inflation Cycles 26
Defib Storage Cap Value 52uF
Press Selector knob to exit

To record the operating data:

1. Hold down OPTIONS and EVENT controls and turn on the device. Hold the controls until ENTER PASSCODE appears. Enter passcode 5433.
2. Select SERVICE from the SETUP Menu. Enter passcode 5433.
3. Navigate to SERVICE/STATUS/COUNTERS. On the **PIP Checklist**, record the shocks since last reset (in boxes) and total shocks since the device was built. Select CLEAR ALL to reset box counters (if desired).
4. Select PREVIOUS PAGE.
5. Select DEVICE LOG. Record the following on the **PIP Checklist**:
   Power Cycle Count
   Pacing Count (if pacing option installed)
   Shock Count
   Power On Time
   Printer On Time
   SpO2 Operating Time (if SpO2 option installed)
   CO2 Operating Time (if CO2 option installed)
   NIBP Inflation Cycles (if NIBP option installed)
   Defib Storage Cap Value (only for Edmark device)
6. Press the Selector to exit, then the HOME SCREEN key for the SERVICE menu.
7. Continue directly to the next test while still in SERVICE mode.

PIP – Instructions

PIP – Keypads



A09 Small Keypad

A10 Large Keypad

To test the keypads:

1. Select TESTS... from the on-screen SERVICE Menu.
2. Select BUTTONS from the SERVICE/TEST Sub-Menu.
3. Press each front panel control when prompted by the flashing control legend (although you may press the controls in any order).

Note: The keypad display may include LEAD and SIZE keys. If these keys are not present on your keypad, disregard these text boxes.

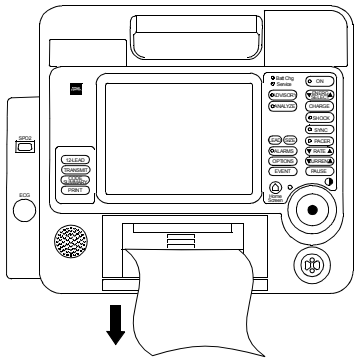
4. Verify with each control pressed that its associated text box is highlighted.

Note: A failure is indicated by a control text box that is not highlighted. It is normal for the controls with up/down arrows to highlight only the arrows.

5. Press the Selector at the end of the test.
6. Record the results on the **PIP Checklist**.
7. Continue directly to the next test while still in SERVICE mode.

PIP – Instructions

PIP – Printer



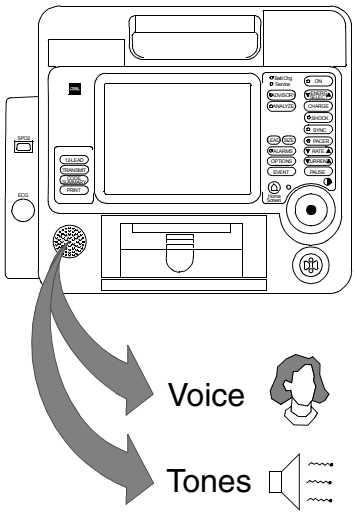
Note: 100 mm printer shown.

To test the 50 mm or 100 mm printer:

1. Select PRINTER... from the on-screen SERVICE menu.
2. Select START to print a test strip.
3. Inspect the test strip for the following attributes:
   - The large “X” form is printed without missing dots.
   - Seven horizontal lines (one very close to the lower paper margin).
   - The character set is printed clearly without broken characters.
   - Vertical lines spaced 25 mm ±5% apart. (See **TCP – Printer Calibration**.)
4. Open the printer door and verify the CHECK PRINTER message appears at the bottom of the screen.
5. Close the printer door.
6. Select PREVIOUS PAGE to return to the SERVICE/TESTS sub-menu.
7. Record the results on the **PIP Checklist**.
8. Continue directly to the next test while still in SERVICE mode.

PIP – Instructions

PIP – Audio



To test the UUT voice prompts and tones:

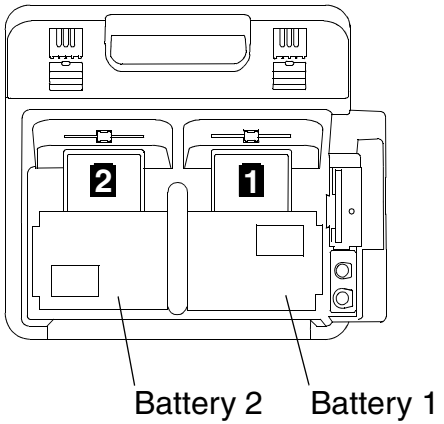
1. Select VOICE/TONE... from the SERVICE/TESTS Sub-Menu.
2. Select START. Voice prompts sound in the speaker.
3. When satisfied that the voice prompts are clearly audible and reproduced without distortion, turn off the device.

Note: You may listen to a complete replay of all voice prompts and tones, but it is not required for verification of this function.

4. Record the results on the **PIP Checklist**.
5. Turn off the UUT.
6. This completes PIP testing using the SERVICE MODE test feature.
7. Continue directly to the **Power Source Management** tests.

PIP – Instructions

PIP – Power Source Management

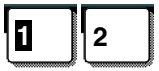


To test battery switching:

1. Turn on the UUT.

Note: Battery indications may look slightly different.

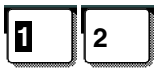
2. Notice the two battery icons at the top of the display, with the UUT powered by Battery 1.



3. Remove Battery 1. Verify the Battery 1 icon disappears and the UUT remains powered by Battery 2.

4. Reinsert Battery 1 and remove Battery 2. Verify the Battery 2 icon disappears and the UUT remains powered by Battery 1.

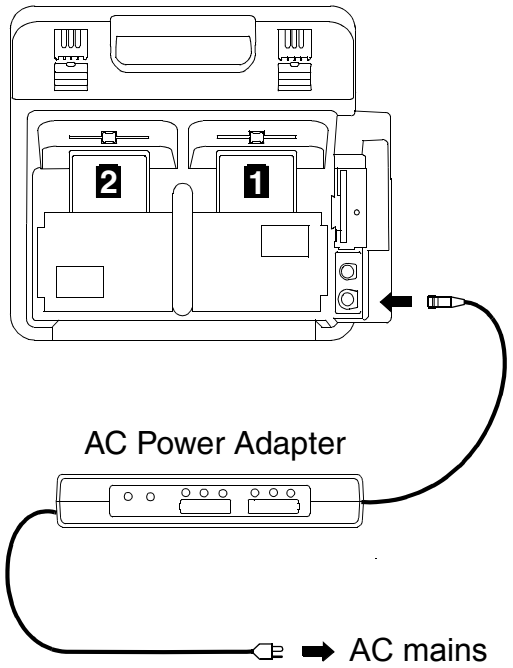
5. Reinsert Battery 2. Verify both battery icons appear.



6. Record the results on the **PIP Checklist**.
7. Turn off the UUT.

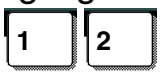
PIP – Instructions

PIP – Power Source Management (continued)

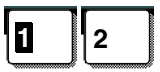


To test auxiliary power switching:

1. Connect an AC Power Adapter to the ac mains and the output cable to the Auxiliary Connector at the rear of the device. See the **Operating Instructions – AC and DC Power Adapters** for more information.
2. Turn on the UUT and verify that the battery icons appear but neither is highlighted.

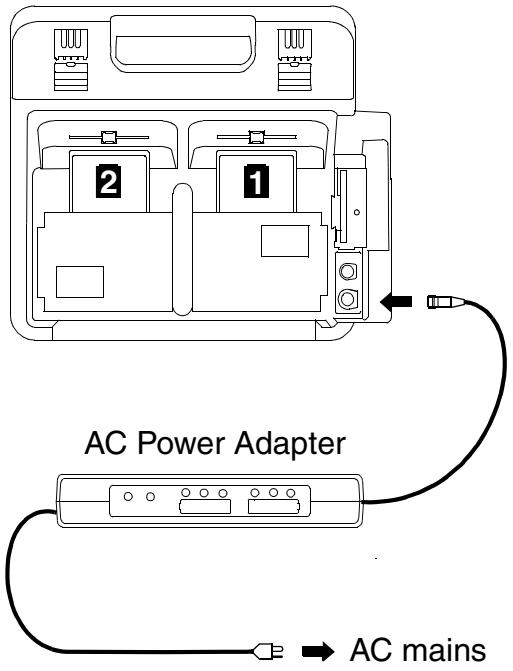
3. Unplug the Power Adapter cable from the UUT Auxiliary Connector. One of the UUT battery icons is highlighted.

4. Record the results on the **PIP Checklist**.
5. Continue directly to the next test.

PIP – Instructions

PIP – Power Source Management (continued)

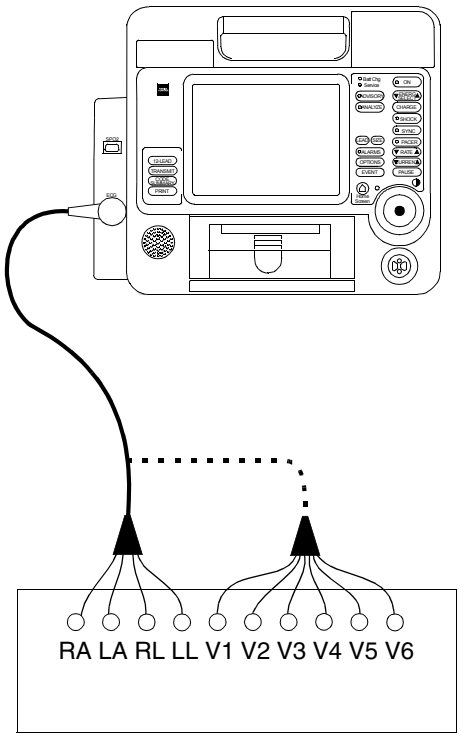


To test defibrillator charge current delivery with auxiliary power:

1. Turn off the UUT and remove both batteries.
2. Connect the AC Power Adapter to the ac mains and the output cable to the Auxiliary Connector at the rear of the device.
3. Turn on the UUT.
4. Press ENERGY SELECT and choose a level of 360 J.
5. Press CHARGE and note the charging cycle is 10 seconds or less.
6. Record the results on the **PIP Checklist**.
7. Turn off the UUT.
8. Disconnect the AC Power Adapter from the UUT and ac mains, and reinstall the two batteries.
9. Depending upon the configuration of the UUT, continue directly to **PIP – 12-Lead ECG Characteristics** or **PIP – 3-Lead ECG Characteristics**.

PIP – Instructions

PIP – 12-Lead ECG Characteristics



Dynatech 215A/217A
Patient Simulator

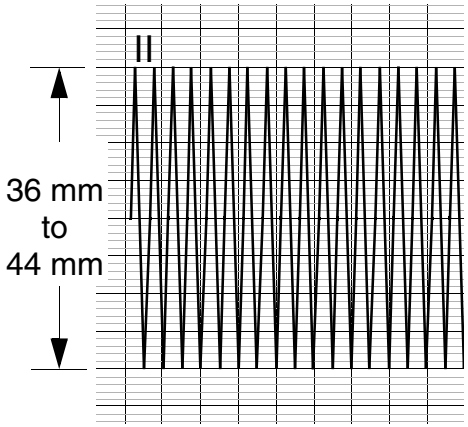
To test 12-Lead ECG Leads Off detection:

Note: If your device does not have a 12-LEAD control on the A09 Small Keypad, perform the **PIP – 3-Lead ECG Characteristics** test instead.

1. Connect the Main ECG cable, with the Limb Lead and Precordial Lead attachments, and connect all 10 ECG leads to the patient simulator.
2. Program the patient simulator output for a 60 BPM, NSR.
3. Set the UUT lead selection to LEAD II.
4. Remove the LL lead from the patient simulator.
5. Verify the UUT displays a LEADS OFF screen message.
6. Reconnect the LL lead.
7. Repeat steps 4 through 6 for the RA and RL leads.
8. Press the 12-LEAD button, then press the Selector.
9. Verify the UUT display shows ACQUIRING 12-LEAD.
10. Remove the LA lead from the patient simulator.
11. Verify the UUT displays a LEADS OFF screen message.

PIP – Instructions

PIP – 12-Lead ECG Characteristics (cont'd)



Lead	Printed Peak-to-Peak
I	18 mm to 22 mm
II	36 mm to 44 mm
V1	36 mm to 44 mm
V2	36 mm to 44 mm
V3	36 mm to 44 mm
V4	36 mm to 44 mm
V5	36 mm to 44 mm
V6	36 mm to 44 mm

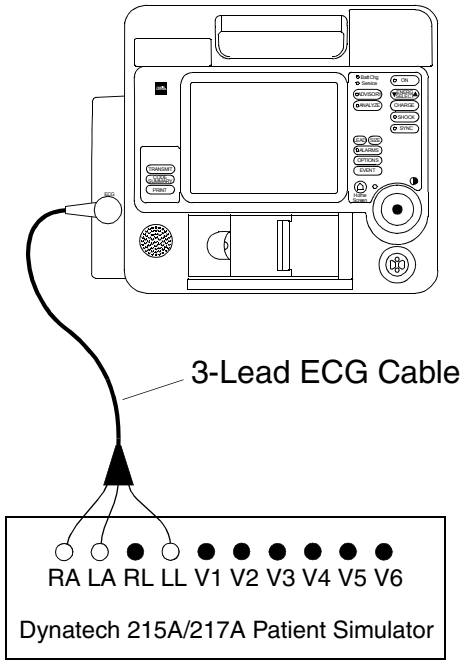
12. Reconnect the LA lead.
13. Repeat steps 8 through 11 for the V1, V2, V3, V4, V5, and V6 leads.
14. Record the results on the **PIP Checklist**.

To test 12-Lead ECG gain:

1. Program the patient simulator output for a 1 mv, 10 Hz sine wave.
2. Set the ECG SIZE to 4.0.
3. Set the UUT lead selection to LEAD II.
4. Record 5 seconds of ECG LEAD II and confirm the printed signal amplitude is 36 mm to 44 mm peak-to-peak as shown at the left.
5. Repeat steps 3 and 4 for leads I, V1, V2, V3, V4, V5, and V6, substituting the signal amplitudes given in the table at the left.
6. Record the results on the **PIP Checklist**.
7. Depending upon the UUT configuration, continue directly to **PIP – QUIK-COMBO Impedance Sense** or **PIP – Standard Paddles Delivered Energy**.

PIP – Instructions

PIP – 3-Lead ECG Characteristics



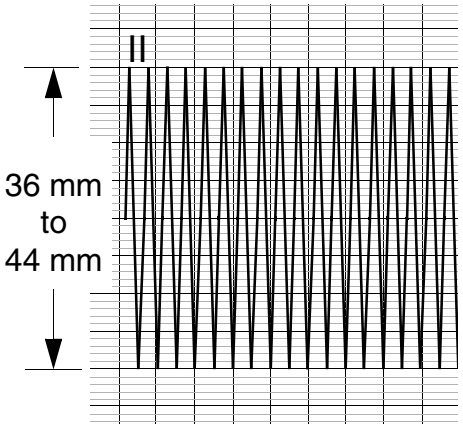
To test 3-Lead ECG Leads Off detection:

Note: If your device has a 12-LEAD control on the A09 Small Keypad, perform the **PIP – 12-Lead ECG Characteristics** test instead of this test.

1. Connect the 3-Lead ECG Cable between the UUT and patient simulator as shown at the left.
2. Program the patient simulator output for a 60 BPM, NSR.
3. Set the UUT lead selection to LEAD II.
4. Remove the LL lead from the patient simulator.
5. Verify the UUT displays an LL LEADS OFF screen message.
6. Reconnect the LL lead.
7. Repeat steps 4 through 6 for the RA lead.
8. Remove the LA lead from the patient simulator and verify the UUT displays the ECG LEADS OFF screen message.
9. Record the results on the **PIP Checklist**.
10. Reconnect the LA lead, then continue directly to the next page with this setup in place.

PIP – Instructions

PIP – 3-Lead ECG Characteristics (continued)



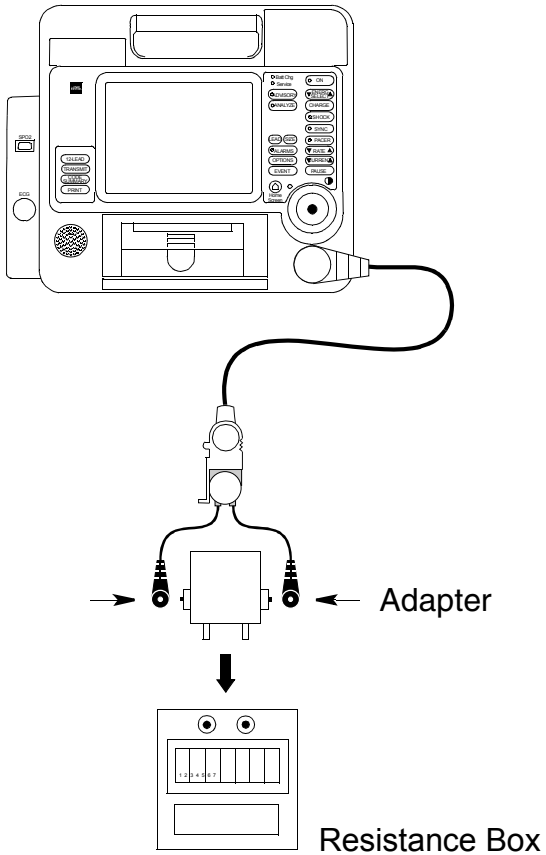
Lead	Printed Peak-to-Peak
I	18 mm to 22 mm
II	36 mm to 44 mm

To test 3-Lead ECG gain:

1. Program the patient simulator output for a 1 mv, 10 Hz sine wave.
2. Set the ECG SIZE to 4.0.
3. Set the UUT lead selection to LEAD II.
4. Record 5 seconds of ECG LEAD II and confirm the printed signal amplitude is 36 mm to 44 mm peak-to-peak as shown at the left.
5. Repeat steps 3 and 4 for LEAD I, substituting the signal amplitudes given in the table at the left.
6. Record the results on the **PIP Checklist**.
7. Depending upon the UUT configuration, continue directly to **PIP – QUIK-COMBO Impedance Sense** or **PIP – Standard Paddles User Test**.

PIP – Instructions

QUIK-COMBO Impedance Sense



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To test QUIK-COMBO Impedance Sense circuitry:

1. Connect the QUIK-COMBO Test Post snaps to a decade resistance box, using whatever adapter is appropriate to make connections.
2. Place the UUT into MANUAL mode (ADVISORY off).
3. Set the UUT lead selection to PADDLES.
4. Set the decade resistance box to 370 Ω.
5. Verify the UUT display displays the PADDLES LEADS OFF message.
6. Record the results on the **PIP Checklist**.
7. Set the decade resistance box to 238 Ω.
8. Verify the PADDLES LEADS OFF message is removed from the UUT display.
9. Record the results on the **PIP Checklist**.
10. Remove the decade resistance box.
11. Continue directly to **PIP – QUIK-COMBO or FAST-PATCH Therapy Cable User Test**.

PIP – Instructions

QUIK-COMBO or FAST-PATCH Therapy Cable User Test

To test QUIK-COMBO or FAST-PATCH cable:

1. Press OPTIONS to access User Test.

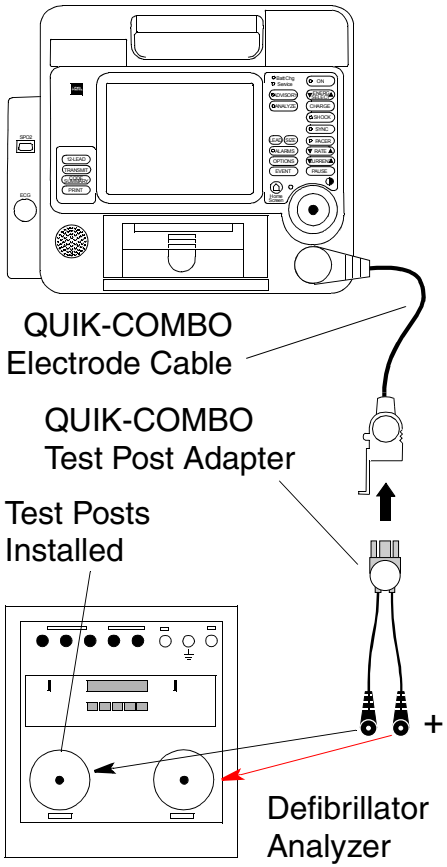
When selected, the User Test automatically performs the following tasks:

- Performs self-tests
- Charges to 10 J and discharges internally (this energy is not accessible at the therapy connector)
- Prints a Pass/Fail report

2. Record the results on the **PIP Checklist**.
3. Continue directly to **PIP – QUIK-COMBO Delivered Energy**.

PIP – Instructions

PIP – QUIK-COMBO Delivered Energy



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To test delivered energy using QUIK-COMBO electrodes:

Note: For Standard Paddles, see **PIP – Standard Paddles Delivered Energy**.

Note: For a biphasic UUT, use a defibrillation analyzer specified for biphasic waveforms. See the **PIP – Test Equipment Requirements table**.

1. Set up the device and defibrillator analyzer as shown.
2. Turn on the UUT, then press the ENERGY SELECT control to select 2 J.
3. Press the CHARGE control and wait for the UUT to reach full charge. Then press the SHOCK control to discharge the UUT.

PIP – Instructions

PIP – QUIK-COMBO Delivered Energy (continued)

4. Verify the defibrillator analyzer indicates the delivered energy is within the acceptable output limits, shown below.

Energy Level (J)	Acceptable Output (J)
2	1.0 to 3.0
10	9.0 to 11.0
70	65.1 to 74.9
200	186.0 to 214.0
360	334.8 to 385.2

5. Repeat steps 2 through 4 for the remaining energy levels specified in the table.

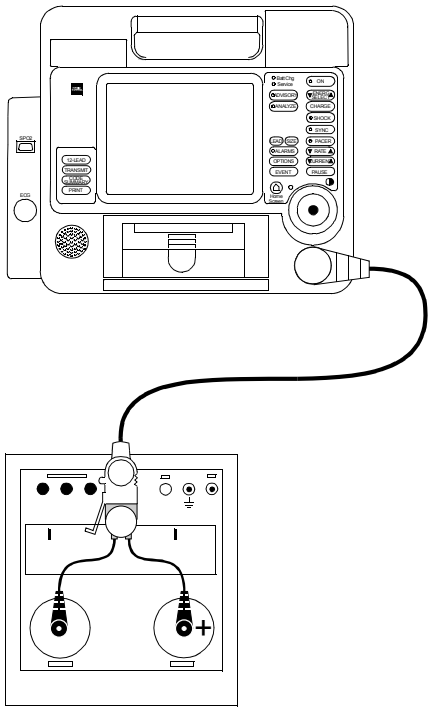
   Note: Perform the **TCP – Defibrillator Calibration** if the delivered energy falls outside of the acceptable output range.

6. Record the results on the **PIP Checklist**.

7. Continue directly to **PIP – QUIK-COMBO ECG Characteristics**.

PIP – Instructions

PIP – QUIK-COMBO ECG Characteristics



To test QUIK-COMBO ECG gain:

Note: If using Standard Paddles, see **PIP – Standard Paddles ECG Characteristics**.

1. Program the defibrillator analyzer output for a 1 mV, 10 Hz sine wave.
2. Set the UUT ECG SIZE to 4.0.
3. Set the UUT lead selection to PADDLES.
4. Record 10 seconds of PADDLES ECG and confirm the printed signal amplitude is 36 mm to 44 mm peak-to-peak.

Note: The BIO-TEK QED-6 produces a 1.1 mV output; confirm the printed signal amplitude is 38 mm to 50 mm peak-to-peak.

5. Record the results on the **PIP Checklist**.
6. Continue directly to the next page with this setup in place.

PIP – Instructions

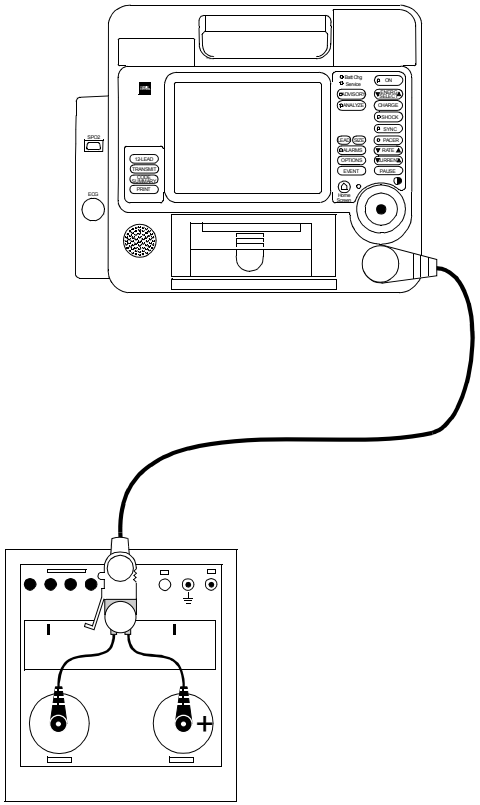
PIP – QUIK-COMBO ECG Characteristics (continued)

To test QUIK-COMBO ECG fast restore:

1. Program the defibrillator analyzer output for a 30 BPM, NSR.
2. Set the UUT ECG SIZE to 4.0.
3. Charge the UUT to 360 J.
4. Upon reaching full charge, press the PRINT control to begin recording.
5. Discharge the UUT into the defibrillator analyzer.
6. Allow the printer to run until the defibrillation event and associated ECG waveform finishes printing.
7. Press the PRINT control to turn the printer off.
8. Note the Shock # and ENERGY DELIVERED event mark and verify the ECG returns to the baseline in 0.5 seconds (12.5 mm) or less.
9. Record the results on the **PIP Checklist**.
10. Continue directly to **PIP – QUIK-COMBO Synchronous Cardioversion**.

PIP – Instructions

PIP – QUIK-COMBO Synchronous Cardioversion



To test Synchronous Cardioversion using QUIK-COMBO electrodes:

Note: If using Standard Paddles, see **PIP – Standard Paddles Synchronous Cardioversion**.

WARNING!

Shock hazard. Electrical energy is discharged during this procedure. Do not allow the electrodes to contact any person or conductive surfaces except as described below.

1. Set the UUT ECG SIZE to 1.0. Set the defibrillator analyzer to measure SYNC.
2. Press the SYNC control on the UUT.
3. Verify the SYNC control LED turns on and R-wave markers appear on the ECG waveform.
4. Charge the UUT to 10 J. Upon reaching full charge, press the SHOCK control to discharge the UUT.
5. Verify the defibrillator analyzer measures a sync delay of 60 ms or less.
6. Record the results on the **PIP Checklist**.
7. Depending upon the UUT configuration, continue directly to **PIP – Pacer Option Characteristics** or **PIP – No Pacer Option Characteristic**.

PIP – Instructions

Standard Paddles User Test

To perform the Standard Paddles User Test:

1. Remove the paddles and check that the paddle surfaces and paddle wells are clean and dry and free of any debris.

WARNING!

Shock hazard. The Conductive gel (wet or dry) on the paddle handles and in the paddle wells may allow the electrical energy to arc between paddles during discharge. Thoroughly clean and dry the paddles and paddle wells after use and before performing the Standard Paddles User Test.

2. Replace the paddles in the paddle wells.
3. Turn on the UUT.
4. Select 10 J.
5. Press the CHARGE button on the Apex paddle.
6. Confirm the tone indicates full charge within 5 seconds.
7. Press only the APEX discharge button and confirm that the defibrillator does not discharge. Release the APEX discharge button.

PIP – Instructions

PIP – Standard Paddles User Test (continued)

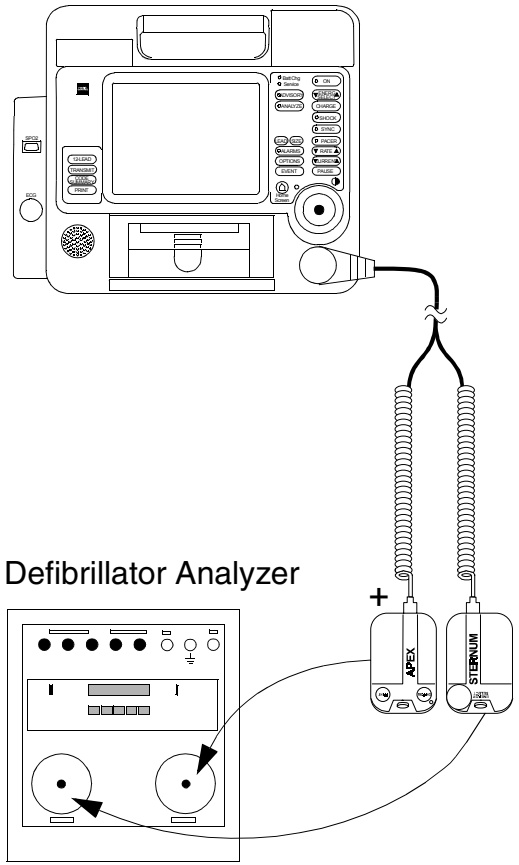
8. Press only the STERNUM discharge button and confirm that the defibrillator does not discharge. Release the STERNUM discharge button.
9. With the paddles still in the paddle wells, press both discharge buttons simultaneously.
10. For an Edmark UUT, confirm ENERGY NOT DELIVERED message appears, indicating energy was removed internally.

    Note: For a biphasic UUT, the message ABNORMAL ENERGY DELIVERED is displayed.

11. Record the results on the **PIP Checklist**.
12. Continue directly to **PIP – Standard Paddles Delivered Energy**.

PIP – Instructions

PIP – Standard Paddles Delivered Energy



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To test delivered energy using Standard Paddles:

Note: For QUIK-COMBO electrodes, see **QUIK-COMBO Delivered Energy**.

Note: For a biphasic UUT, make sure the defibrillation analyzer is compatible. See the **PIP – Test Equipment Requirements table**.

1. Set up the device and defibrillator analyzer as shown.
2. Rotate the STERNUM PADDLE ENERGY SELECT dial to select 2 J.
3. Press the Apex paddle CHARGE button and wait for the UUT to reach full charge. Then press the paddles SHOCK switches to discharge the UUT.

PIP – Instructions

PIP – Standard Paddles Delivered Energy (continued)

4. Verify the defibrillator analyzer indicates the delivered energy is within the acceptable output limits, shown below.

Energy Level (J)	Acceptable Output (J)
2	1.0 to 3.0
10	9.0 to 11.0
70	65.1 to 74.9
200	186.0 to 214.0
360	334.8 to 385.2

5. Repeat steps 2 through 4 for the remaining energy levels specified in the table.

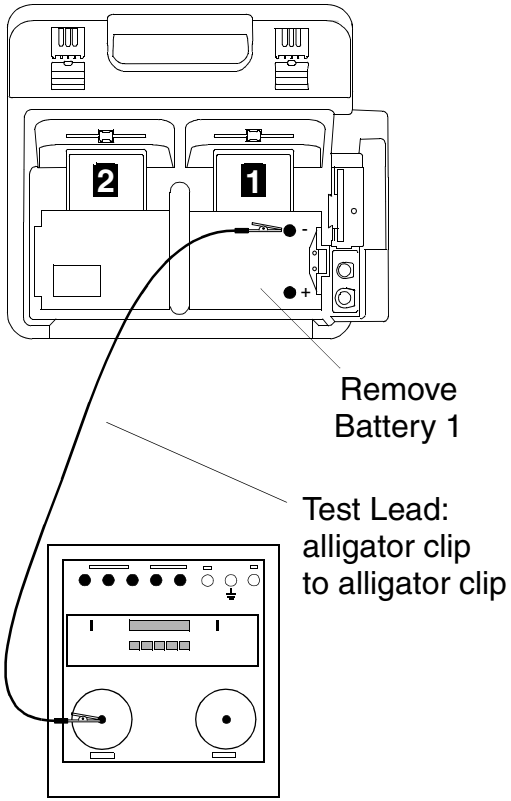
   Note: Perform the **TCP – Defibrillator Calibration** if the delivered energy falls outside of the acceptable output range.

6. Record the results on the **PIP Checklist**.

7. Continue directly to **PIP – Standard Paddles Defibrillation Isolation**.

PIP – Instructions

PIP – Standard Paddles Defibrillation Isolation



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To test defibrillation isolation with Standard Paddles:

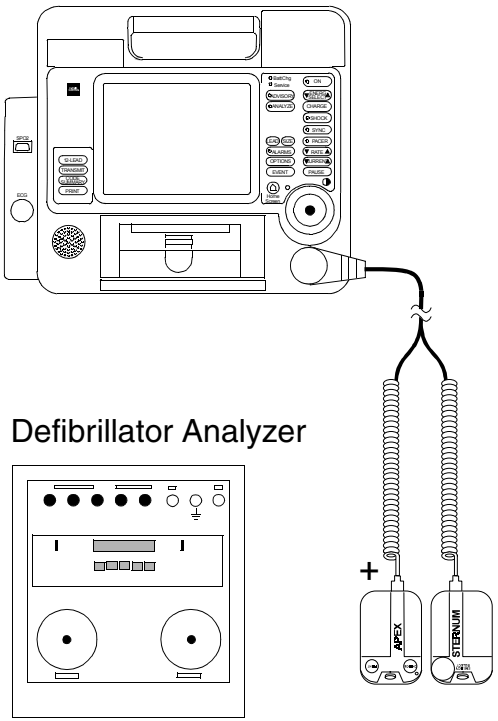
WARNING!

Shock hazard. Electrical energy is discharged during this procedure. Do not allow the paddle electrodes to contact any person or conductive surfaces except as described below.

1. Establish the setup shown on this and the following page.
2. Turn on the UUT.
3. Verify the defibrillator analyzer is on and the display displays ENERGY. If not, turn on the defibrillator analyzer and press the ENRG softkey.
4. Rotate the Sternum paddle ENERGY SELECT dial to select 360 J.
5. Press the Apex paddle CHARGE button.
6. Upon reaching full charge, place the Apex paddle on the defibrillator analyzer Apex (+) test pad while holding the Sternum paddle in open air.

PIP – Instructions

PIP – Standard Paddles Defibrillation Isolation (continued)

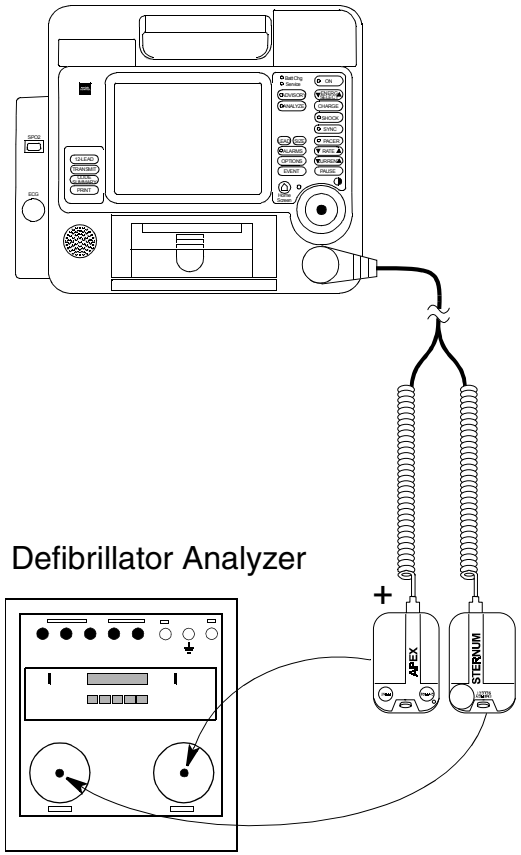


Defibrillator Analyzer

7. Simultaneously press the paddles SHOCK switches to discharge the UUT.
8. Verify the defibrillator analyzer indicates a delivered energy of less than 18 J.
9. Change the alligator clip lead to the other defibrillator analyzer test post.
10. Press the Apex paddle CHARGE button.
11. Upon reaching full charge, place the Sternum paddle on the defibrillator analyzer Sternum (-) test pad while holding the Apex paddle in open air.
12. Simultaneously press the paddles SHOCK switches to discharge the UUT.
13. Verify the defibrillator analyzer indicates a delivered energy of less than 18 J.
14. Turn off the device.
15. Remove the test lead and reinstall Battery 1.
16. Record the results on the **PIP Checklist**.
17. Continue directly to **PIP – Standard Paddles ECG Characteristics**.

PIP – Instructions

PIP – Standard Paddles ECG Characteristics



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To test Paddles ECG gain:

Note: If using QUIK-COMBO electrodes, see **PIP – QUIK-COMBO ECG Characteristics**.

1. Program the defibrillator analyzer output for a 1 mV, 10 Hz sine wave.
2. Set the UUT ECG SIZE to 4.0.
3. Set the UUT lead selection to PADDLES.
4. Place the paddles on the defibrillator analyzer test pads.
5. Record 10 seconds of PADDLES ECG and confirm the printed signal amplitude is 36 mm to 44 mm peak-to-peak.

   Note: BIO-TEK QED-6 produces a 1.1 mV output; confirm the printed signal amplitude is 38 mm to 50 mm peak-to-peak.
6. Record the results on the **PIP Checklist**.
7. Continue directly to the next page with this setup in place.

PIP – Instructions

PIP – Standard Paddles ECG Characteristics (continued)

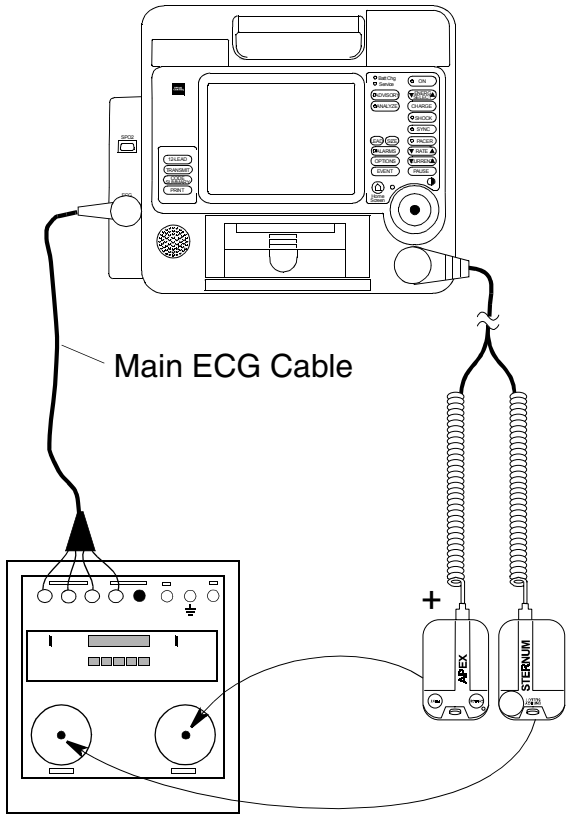
To test paddles ECG fast restore:

1. Program the defibrillator analyzer output for a 30 BPM, NSR.
2. Set the UUT ECG SIZE to 4.0.
3. Charge the UUT to 360 J.

   Note: Maintain contact between the defibrillator paddles and the defibrillator analyzer test load plates throughout this test.
4. Upon reaching full charge, press the PRINT control to begin recording.
5. Discharge the UUT into the defibrillator analyzer.
6. Allow the printer to run until the defibrillation event and associated ECG waveform finish printing.
7. Press the PRINT control to turn the printer off.
8. Note the ENERGY DELIVERED event mark and verify the ECG returns to the baseline in 0.5 seconds (12.5 mm) or less.
9. Record the results on the **PIP Checklist**.
10. Continue directly to **PIP – Standard Paddles Synchronous Cardioversion**.

PIP – Instructions

PIP – Standard Paddles Synchronous Cardioversion



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To test Synchronous Cardioversion using Standard Paddles:

Note: If the UUT does not have "sync in paddles" feature, skip this test. If using QUIK-COMBO electrodes, see **PIP – QUIK-COMBO Synchronous Cardioversion**.

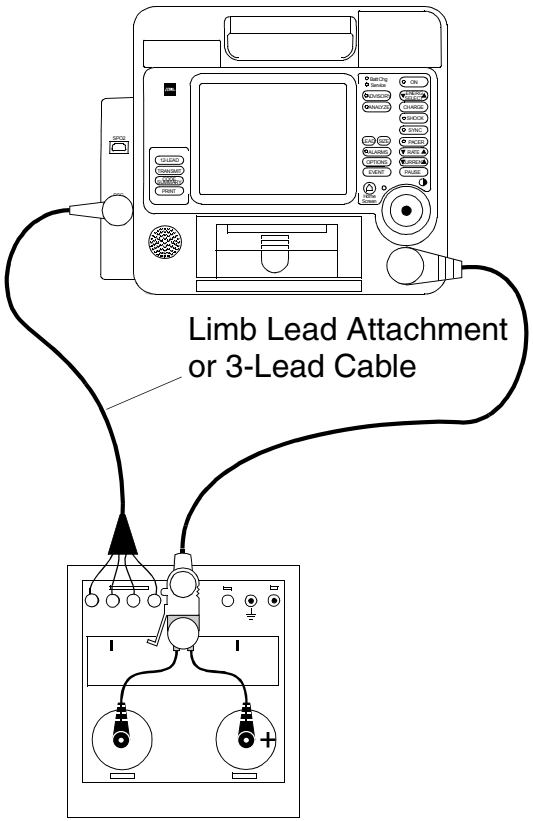
WARNING!

Shock hazard. Electrical energy is discharged during this procedure. Do not allow the paddles to contact any person or conductive surfaces except as described below.

1. Connect the Main ECG Cable between the UUT and patient simulator.
2. Set the UUT ECG SIZE to 1.0. Select Lead II. Set the defibrillator analyzer to measure SYNC.
3. Press the SYNC control on the UUT. Make sure lead II is selected. Verify the SYNC control LED turns on and R-wave markers appear on the ECG waveform.
4. Charge the UUT to 10 J. Upon reaching full charge, simultaneously press the paddles SHOCK switches to discharge the UUT. Verify the defibrillator analyzer measures a sync delay of 60 ms or less.
5. Record the results on the **PIP Checklist**.
6. Depending upon the UUT configuration, continue directly to **PIP – Pacer Option Characteristics** or **PIP – No Pacer Option Characteristic**.

PIP – Instructions

PIP – Pacer Option Characteristics



To test Pacer Leads Off Detection:

Note: Conduct this test only if your device has a PACER control on the A10 Large Keypad. If your device does not have a PACER control, perform the **PIP – No Pacer Option Characteristic** test.

1. Set the defibrillator analyzer to measure peak current pacing parameters.
2. Press the PACER control on the UUT.
3. Verify the PACER control LED lights and the PACER overlay appears.
4. Disconnect one of the Test Post Adapter snaps from the defibrillator analyzer.
5. Verify the PACING/CONNECT ELECTRODES overlay appears accompanied by an audible alarm.
6. Reconnect the Test Post Adapter snap. Verify the PACING/CONNECT ELECTRODES overlay disappears and the alarm stops.
7. Record the results on the **PIP Checklist**.
8. Continue directly to the next page with this setup in place.

PIP – Instructions

PIP – Pacer Option Characteristics (continued)

To test the Pacer Output Current:

1. Press the UUT CURRENT control to select a pacer current of 10 mA.
2. Verify the defibrillator analyzer indicates the pacer output current is within the acceptable output limits, shown below.
3. In this manner, check the peak pacer current for the following settings:

Peak Current Level (mA)	Acceptable Output (mA)
10	5 to 15
50	45 to 55
100	95 to 105
150	142.5 to 157.5
200	190 to 210

Note: Perform the **TCP – Pacing Self Calibration** if the peak pacer current falls outside of the acceptable output range.

4. Record the results on the **PIP Checklist**.
5. Continue directly to the next page with this setup in place.

PIP – Instructions

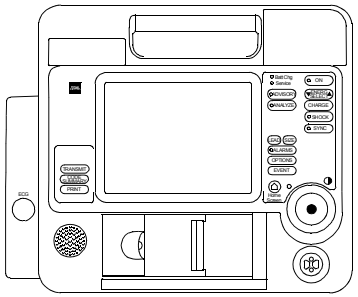
PIP – Pacer Option Characteristics (continued)

To test the Pacer Pulse Width:

1. Press the UUT CURRENT control to select a pacer current of 200 mA.
2. Verify the defibrillator analyzer indicates the pacer pulse width is between 19.0 and 21.0 ms.
3. Press the UUT PACER control to terminate pacing.
4. Record the results on the **PIP Checklist**.
5. Continue directly to **PIP – ECG Analog Output**.

PIP – Instructions

PIP – No Pacer Option Characteristic



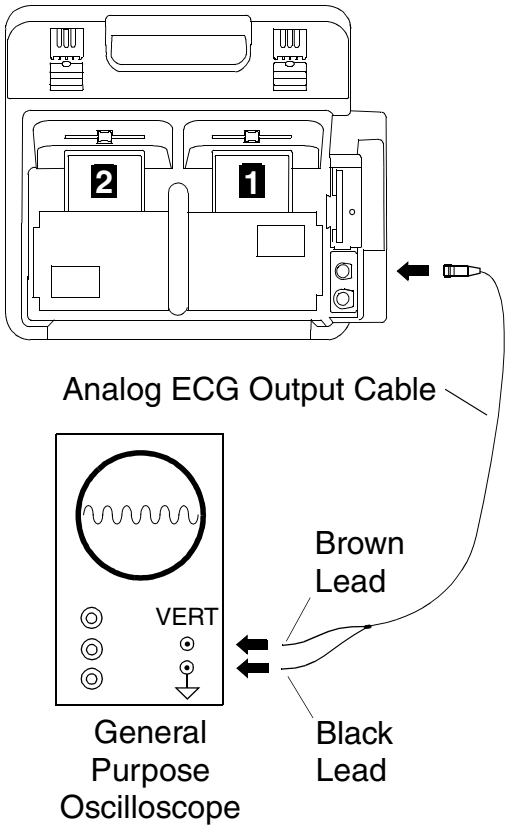
To test the no Pacer option characteristic:

Note: Conduct this test only if the UUT does not have a PACER control on the A10 Large Keypad. If the UUT has a PACER control, perform the **PIP – Pacer Option Characteristics** test.

1. Disconnect all cables from the UUT.
2. Perform the **TCP – Pacing Self Calibration**. It is not necessary to perform Pacing Verification portion of the TCP – Pacing Self Calibration test.
3. After calibration (nominal 1 minute), the message CALIBRATION COMPLETE indicates a successful test.
4. Turn off the device.
5. Record the results on the **PIP Checklist**.
6. Depending upon the configuration of the UUT, continue directly to **PIP – ECG Analog Output**.

PIP – Instructions

PIP – ECG Analog Output



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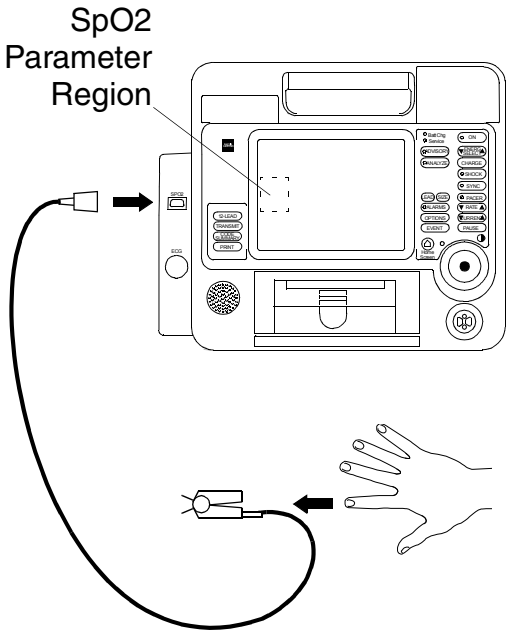
To test the ECG analog output:

Note: This test is optional. Perform only if this feature is used.

1. Establish the test setup as shown at the left.
2. Using the ECG cable supplied with the UUT, input a 1 mV 10 Hz sine wave from the patient simulator.
3. Set the UUT lead selection to LEAD II. (The ECG analog output is in real time at a nominal 1 V/mV and is not affected by the device ECG size setting.)
4. Verify the amplitude of the signal displayed on the oscilloscope is between 0.85 Vp-p and 1.15 Vp-p.
5. Record the results on the **PIP Checklist**.
6. Disconnect the Analog ECG Output Cable from the UUT and oscilloscope.
7. Continue directly to the **PIP – Oximeter** test.

PIP – Instructions

PIP – Oximeter



To test the SpO2 Oximeter:

Note: Complete only if the UUT is equipped with the SpO2 Oximeter option.

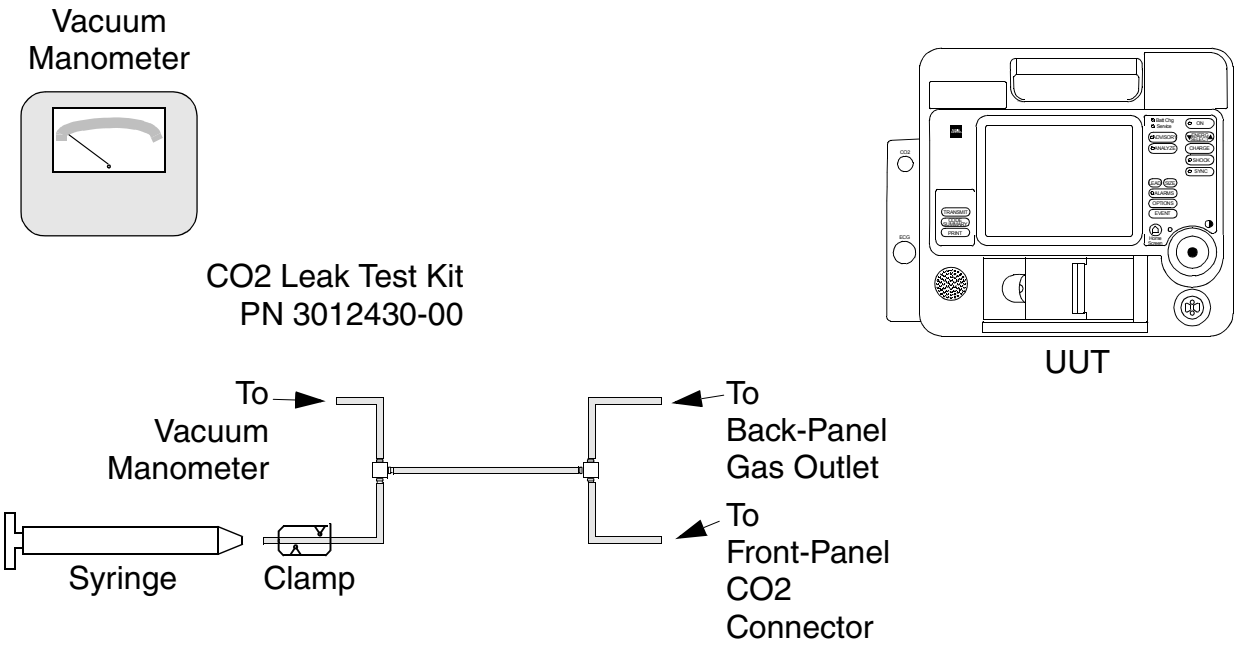
1. Connect the Oximeter finger probe to the SpO2 connector.
2. Verify the SpO2 parameter region appears on the display.
3. Place your index finger into the SpO2 probe. Allow several seconds for the probe to find your pulse. Confirm the SpO2 reading is between 90% and 100%.
4. Disconnect the SpO2 probe.
5. Turn off the UUT.
6. Record the results on the **PIP Checklist**.
7. Continue directly to the **PIP – EtCO2 Verification** test.

PIP – Instructions

PIP – EtCO2 Verification

To test the EtCO2 Monitor for leaks:

1. Set up the test equipment as shown in the diagram below.



PIP – Instructions

PIP – EtCO2 Verification (continued)

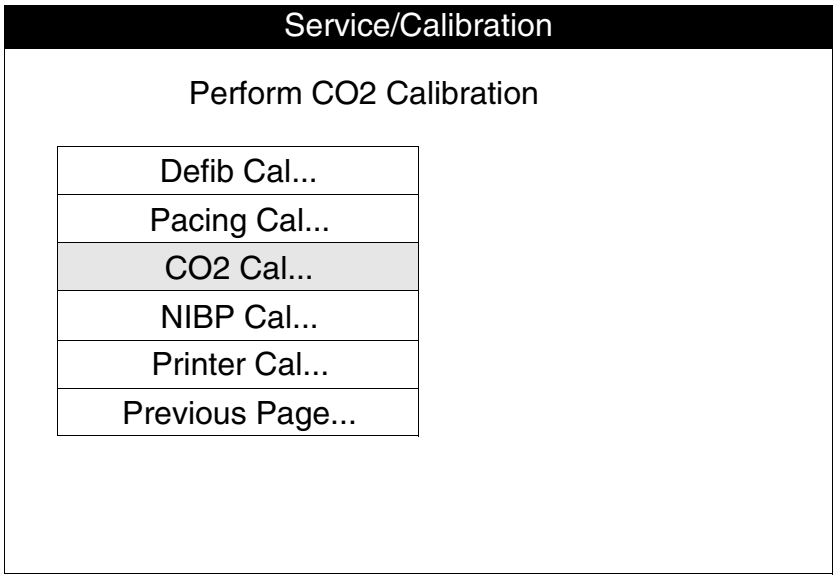
2. Turn the LIFEPAK 12 defibrillator/monitor power OFF. Disconnect the tubing from the front panel CO2 connector.
3. Open the hose clamp and depress the syringe fully.
4. Connect the tubing to the front panel CO2 connector and to the back panel CO2 gas outlet. (**Important:** Press the fittings that connect to the LIFEPAK 12 firmly on to avoid leakage. All tubing ends should now be connected as shown in the diagram on the previous page.)
5. Pull the syringe plunger out to induce vacuum into the system. When the vacuum manometer indicates approximately –300 mBars (–230 mmHg), close the tubing clamp firmly.
6. Begin timing as the clamp is closed. Verify that after 30 seconds, the change in vacuum reading is less than 20 mBars (15 mmHg).
7. Open the tubing connection to the front panel CO2 connector to release the vacuum.
8. Record the results on the **PIP Checklist**.

PIP – Instructions

PIP – EtCO2 Calibration Check

To perform EtCO2 calibration check:

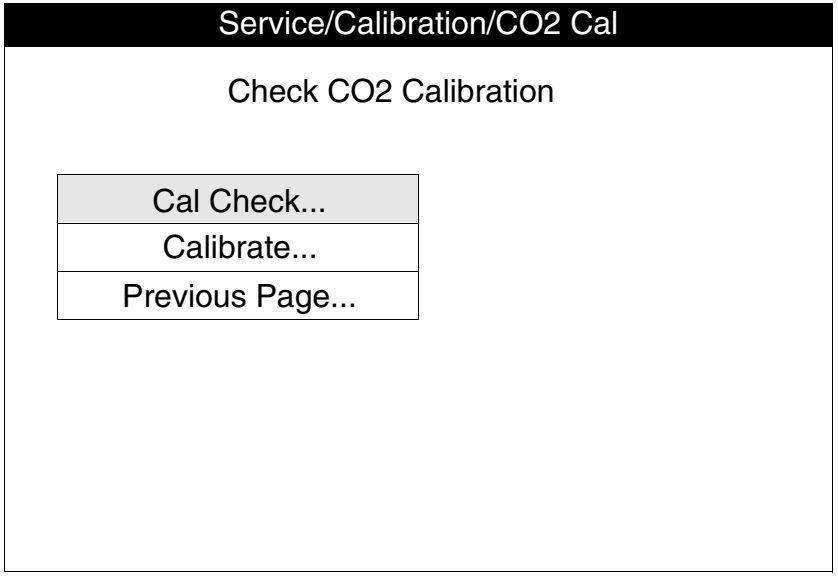
1. Select CALIBRATION from the SERVICE Menu to display the SERVICE/CALIBRATION sub-menu.
2. Select CO2 CAL . . . .



PIP – Instructions

PIP – EtCO2 Calibration Check (continued)

3. Select CAL CHECK. . . .

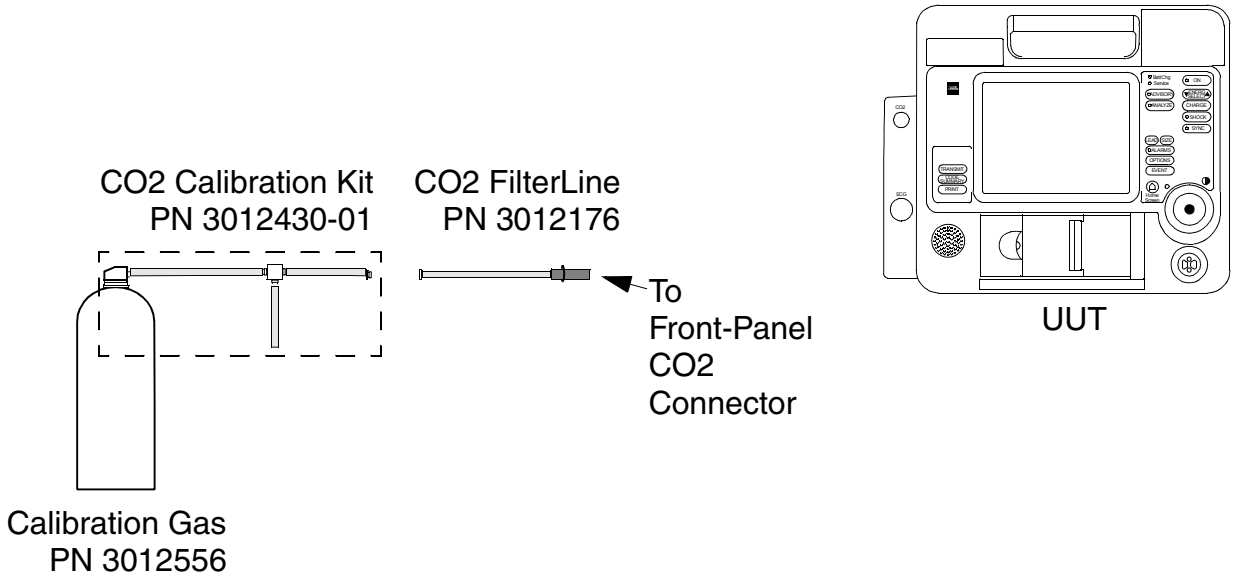


PIP – Instructions

PIP – EtCO2 Calibration Check (continued)

To connect calibration gas:

Connect the calibration gas canister to the front panel CO2 connector using a standard CO2 FilterLine™ and the CO2 calibration kit.

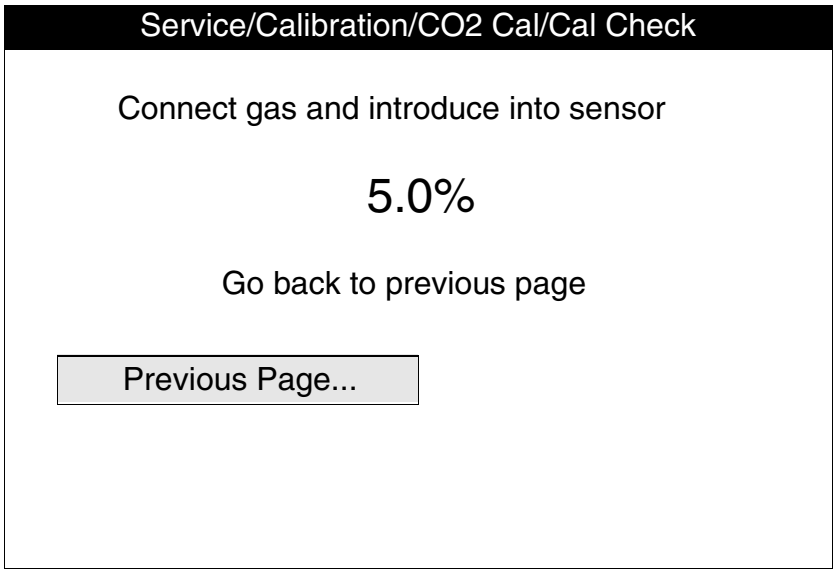


PIP – Instructions

PIP – EtCO2 Calibration Check (continued)

To check calibration:

1. Press and hold the spray nozzle to apply the calibration gas. Release the spray nozzle when the device displays a stable value for the measured CO2 content of the calibration gas.
2. Verify that the measured gas concentration reads 5.0% ±0.5%. If the measured value is incorrect, refer to **TCP – EtCO2 Calibration**.



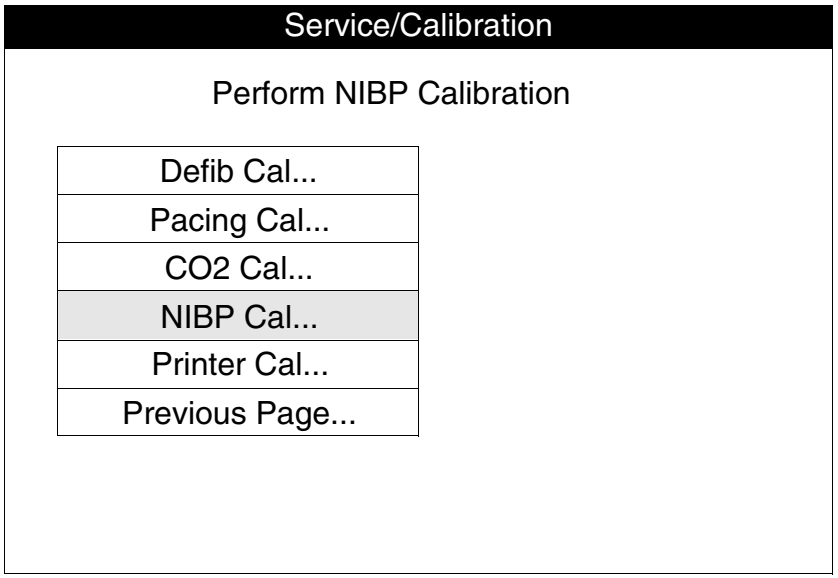
3. Select PREVIOUS PAGE. . . (twice) to return to the SERVICE/CALIBRATION sub-menu.

PIP – Instructions

PIP – NIBP Verification

To perform NIBP calibration check:

1. Select CALIBRATION from the SERVICE menu to display the SERVICE/CALIBRATION sub-menu.
2. Select NIBP CAL . . . .

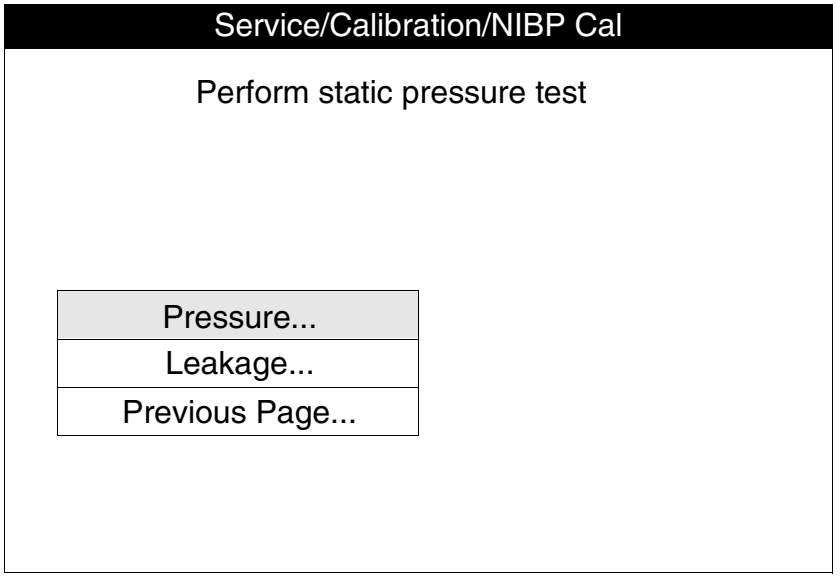


PIP – Instructions

PIP – NIBP Verification (continued)

To perform static pressure check:

Select PRESSURE . . . from the SERVICE/CALIBRATION/NIBP CAL sub-menu.



PIP – Instructions

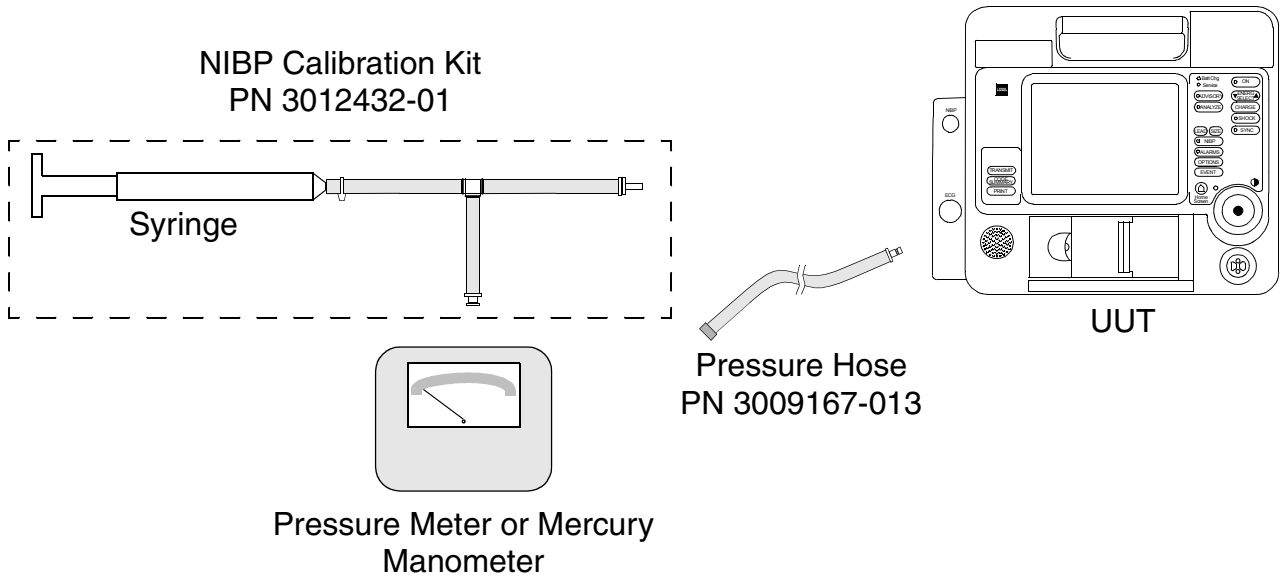
PIP – NIBP Verification (continued)

To perform static pressure check:

1. Set up the NIBP calibration kit as shown in the diagram below.

CAUTION!

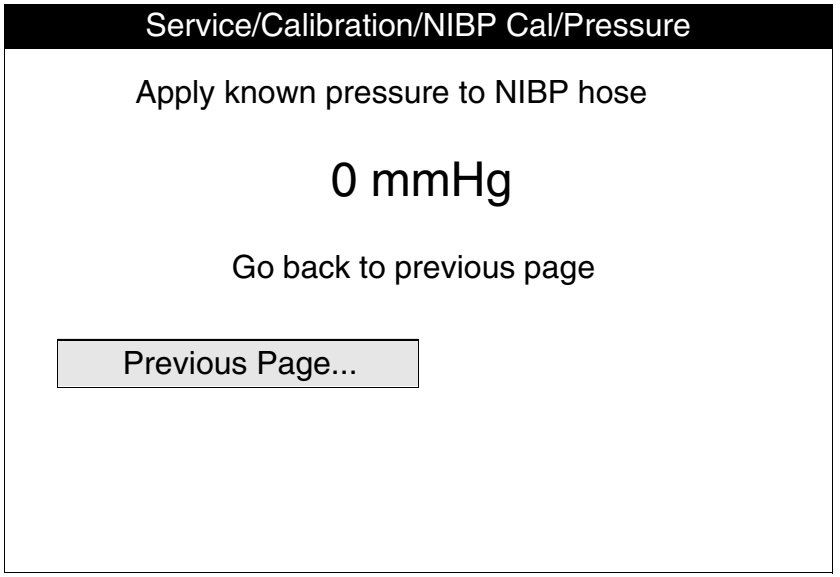
Possible equipment damage. Pulling out on the syringe plunger applies a vacuum to the NIBP connection and may damage the LIFEPAK 12 defibrillator/monitor. DO NOT pull on the plunger. Only push in on the plunger to inflate the system per the following instructions.



PIP – Instructions

PIP – NIBP Verification (continued)

2. Adjust the pressure meter if necessary to a zero initial pressure to ensure that the UUT and the pressure meter agree.



3. Using the syringe, inflate the system to each of the following pressures (as indicated on the manometer or pressure meter):

- 50 mmHg
- 100 mmHg
- 150 mmHg
- 200 mmHg

PIP – Instructions

PIP – NIBP Verification (continued)

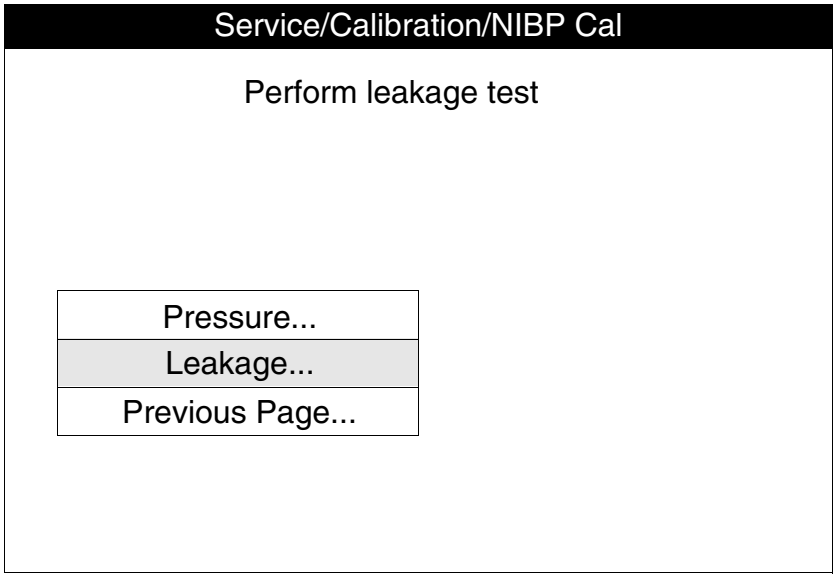
4. Verify that the display of the UUT and the external pressure meter agree within ±3 mmHg.
5. Using the syringe, **slowly** inflate the system until the overpressure switch activates at 285 mmHg ±10 mmHg.
6. Verify that the system depressurizes, and that the light on the NIBP key goes out. The pressure reading at which the overpressure fault occurred remains displayed on the UUT.
7. Select PREVIOUS PAGE....

PIP – Instructions

PIP – NIBP Verification (continued)

To check the NIBP Monitor system for leaks:

1. Select LEAKAGE . . . from the SERVICE/CALIBRATION/NIBP CAL sub-menu.

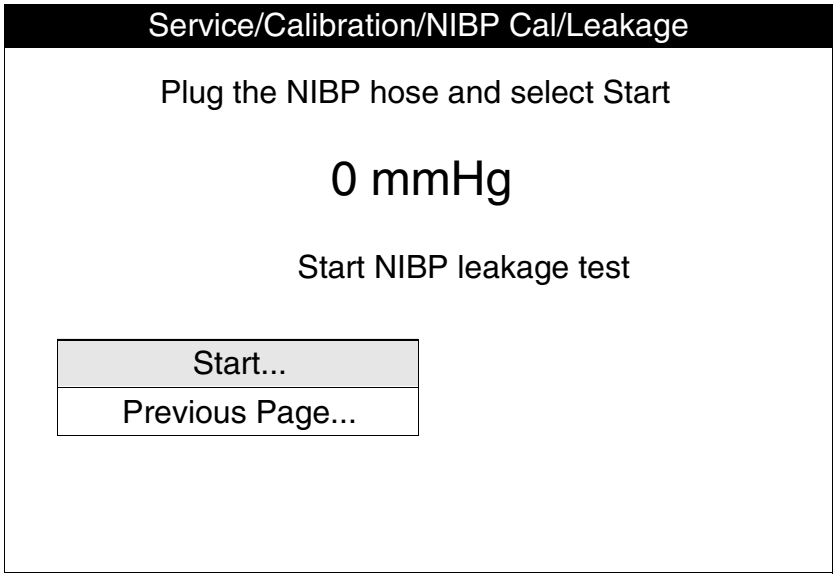


2. Connect a length of NIBP tubing to the NIBP connector.
3. Occlude the distal end of the NIBP tube by plugging it or folding it double and pinching it.

PIP – Instructions

PIP – NIBP Verification (continued)

4. Select START..... The UUT pressurizes the tubing to approximately 200 mmHg. Verify that the message LEAKAGE TEST OK appears.



5. Record the results on the **PIP Checklist**. Turn the UUT off, then on to exit the SERVICE mode.
6. Continue directly to the **PIP – PC Card** test.

PIP – Instructions

PIP – Invasive Pressure Verification

To perform the IP calibration check:

1. Turn the UUT ON.
2. Use the invasive pressure cable to connect the invasive pressure simulator (DNI Nevada 217A or equivalent) to the P1 connector on the parameter bezel.
3. Turn the simulator ON.
4. Set the simulator pressure output to zero.
5. Turn the Selector to highlight CHANNEL 2 in the Wave Form Area of the display.
6. Click the Selector, and click again on WAVEFORM. Select and click P1 to display the pressure waveform.
7. On the CHANNEL 2 overlay, verify that the scale is set to AUTOSCALE. Select and click ZERO to zero the P1 pressure channel.
8. Set the invasive pressure simulator to output static pressures.
9. Select 250 mmHg. Verify that the Mean Arterial Pressure (MAP) display and the pressure waveform read 250 ±9 mmHg within a few seconds.

PIP – Instructions

PIP – Invasive Pressure Verification (continued)

10. Repeat step 8 above, using the following simulated pressures:
    - 200 mmHg (±8 mmHg)
    - 100 mmHg (±6 mmHg)
    - 40 mmHg (±5 mmHg)
    - 20 mmHg (±4 mmHg)
11. With a simulated pressure input of 20 mmHg, turn the Selector to highlight CHANNEL 2 in the Waveform Area of the display, and ZERO the P1 pressure channel again. Verify that the pressure waveform and the MAP display return to the zero.
12. Set the simulator pressure output to zero. Highlight CHANNEL 2, select and click AUTOSCALE again. Press the HOME SCREEN key.
13. Verify that the LIFEPAK 12 displays –20 ±4 mmHg within a few seconds.
14. Disconnect the invasive pressure cable from the P1 connector and connect it to P2.
15. Select CHANNEL 2, and assign P2 to the display.
16. Repeat steps 5 through 13 above for the P2 Pressure Channel.
17. Record the results on the **PIP Checklist**.

PIP – Instructions

PIP – PC Card

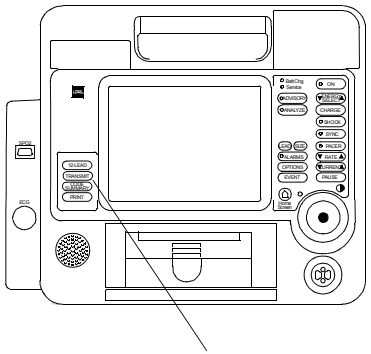
This test checks the ability of the internal PC Card to connect with a remote landline modem. This procedure assumes you are using a suggested PC Card modem, PN 3010294, or equivalent.

Note: If the UUT is not equipped with a PC Card, this test may be omitted.

Note: For additional PC Card testing, see **Troubleshooting — PC Card Test**.

PIP – Instructions

PIP – PC Card (continued)



To test PC Card communications:

1. Hold down the OPTIONS and EVENT controls and turn on the device. Hold until the PASSCODE overlay appears. Enter the SETUP mode passcode **5433**.
2. Rotate the Selector to TRANSMISSION and press.
3. If the UUT has the Fax Option, rotate the Selector to DATA and press.
4. Use the Selector to navigate to PORTS, then INTERNAL, then EDIT STRING 1. Enter the string AT, choosing END as the last character. Press HOME SCREEN.
5. Rotate the Selector to TRANSMISSION and press.
6. If the UUT has the Fax Option, rotate the Selector to DATA and press.
7. Use the Selector to navigate to SITES, SITE 10 (or any unconfigured site). For NAME, enter PIPTEST choosing END as the last character; for PHONE #, enter 11, choosing END as the last character; for OUTPUT PORT, select INTERNAL. Press HOME SCREEN.
8. Turn the device off then on.
9. Press the TRANSMIT control.

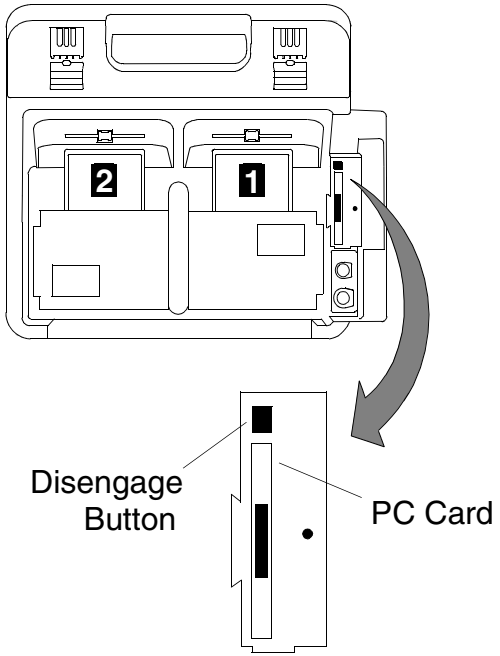
PIP – Instructions

PIP – PC Card (continued)

10. If the UUT has the Fax Option, rotate the Selector to DATA and press.
11. Use the Selector to select PIPTEST for the SITE, then select SEND and press the Selector.
12. Observe the message area at the bottom of the screen. The message DIALING indicates a successful test.
13. Record the results on the **PIP checklist**.
14. Continue directly to the next page with this setup in place.

PIP – Instructions

PIP – PC Card (continued)



Removing the PC Card

To remove the PC Card from the UUT:

1. Turn off the UUT.
2. Press the disengage button just above the PC Card to push the card free of the connector. Remove the PC Card.
3. Reinstall the PC Card cover.
4. Continue directly to the **PIP – Leakage Current** tests.

PIP – Instructions

PIP – Leakage Current

Check the leakage current in accordance with the following industry standards:

- AAMI/ANSI (Association for the Advancement of Medical Instrumentation/ American National Standards Institute) DF2-1989, DF39-1993
- IEC (International Electrotechnical Commission) 601-1 and 601-2-4

WARNING!

Shock Hazard. Failure to properly perform these tests could result in a failure to detect excessive leakage current. Make sure you are familiar with your test equipment and these test performance procedures.

Note: Due to the variety of safety analyzers that may be used for these tests, this Service Manual provides only general instructions. For information about configuration and testing methods, refer to your safety analyzer operating instructions.

Each test result applies to a safety analyzer operating from a 120 vac source or 240 vac source, unless indicated otherwise. For exceptions, the test result includes the safety analyzer operating source. For example, 300 µA (120 vac) or 500 µA (240 vac). All test results are summarized in the **Leakage Current Specifications Summary Table**.

Proceed directly to the **PIP – Chassis Leakage Current Setup**.

PIP – Instructions

PIP – Leakage Current (continued)

Note: If the unit is operating with battery power (no AC power adapter), skip the following tests:

1. Chassis Leakage
2. Earth Leakage
3. Quik Combo (Lead–Gnd)
4. ECG (Lead–Gnd)
5. SpO2 (Lead–Gnd)

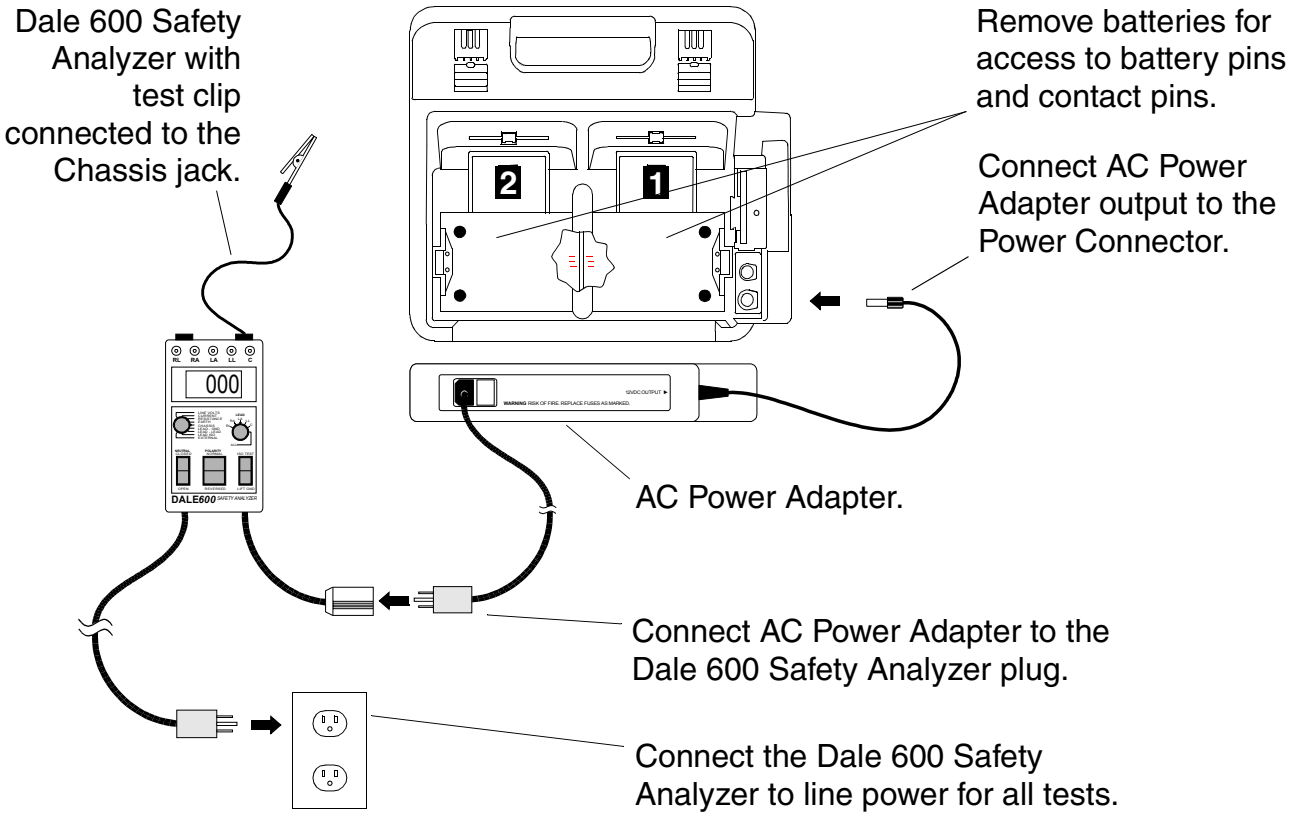
and complete the following tests:

1. Quik Combo (Lead–Lead)
2. Quik Combo Sink Test
3. ECG (Lead–Lead)
4. ECG Sink Test
5. SpO2 Sink Test

PIP – Instructions

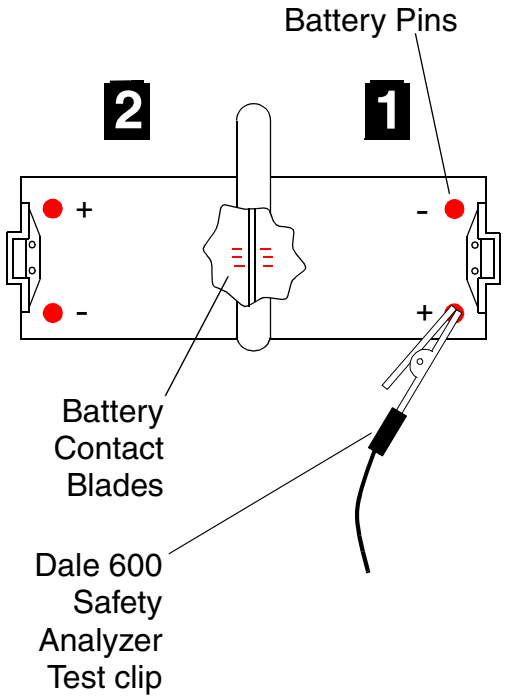
PIP – Chassis Leakage Current Setup

To test chassis leakage current, set up the safety analyzer, LIFEPAK 12 defibrillator/monitor (UUT), and AC Power Adapter as shown below. Continue to the **PIP – Chassis Leakage Current Procedure** when you complete the setup.


Dale 600 Safety Analyzer with test clip connected to the Chassis jack.
Remove batteries for access to battery pins and contact pins.
Connect AC Power Adapter output to the Power Connector.
2
1
AC Power Adapter.
Connect AC Power Adapter to the Dale 600 Safety Analyzer plug.
Connect the Dale 600 Safety Analyzer to line power for all tests.

PIP – Instructions

PIP – Chassis Leakage Current Procedure



To test Chassis Leakage Current:

Note: If you do not have the AC Power Adapter, skip this test.

1. Establish the **PIP – Chassis Leakage Current Setup** shown in the figure on the previous page. The UUT is off for this test.
2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Chassis	All

3. Verify the AC Power Adapter is on.
4. Connect the analyzer clip to the positive (+) battery terminal of Battery Well 1 as shown at the left.
5. Verify measured current is less than 100 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify measured current is less than 300 µA (120 vac) or less than 500 µA (240 vac).

PIP – Instructions

PIP – Chassis Leakage Current Procedure (continued)

8. Release the LIFT GND button and set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

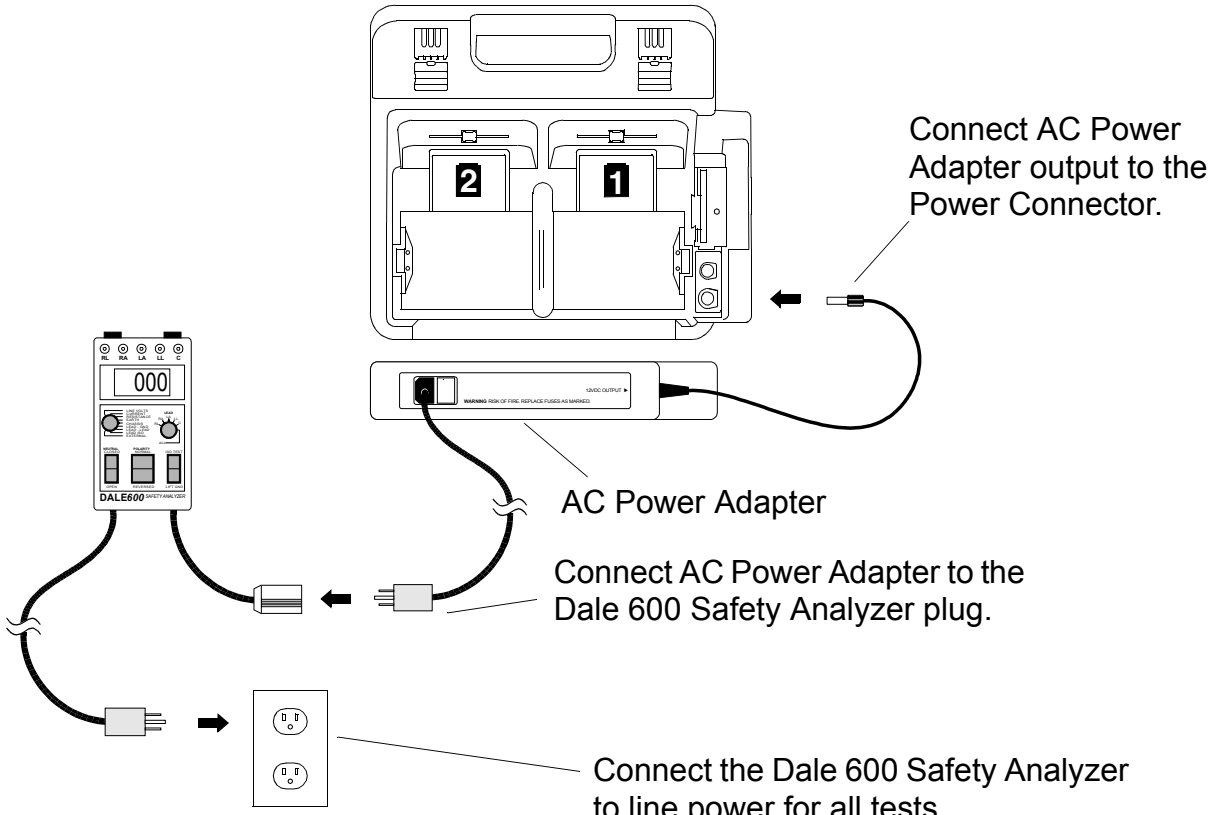
Neutral	Polarity	Mode		Lead
Closed	Reversed	Leakage µA	Lead – Chassis	All

9. Verify measured current is less than 100 µA.
10. Press the LIFT GND button on the safety analyzer.
11. Verify measured current is less than 300 µA (120 vac) or less than 500 µA (240 vac).
12. Release the LIFT GND button on the safety analyzer.
13. Repeat steps 4 through 12 for the three remaining battery pins and all six battery contact blades on the A07 Contact PCB.
14. Record all results on the **PIP Checklist**.
15. Continue directly to the next leakage current test.

PIP – Instructions

PIP – Earth Leakage Current Setup

To test earth leakage current, set up the safety analyzer, UUT, and AC Power Adapter as shown below. Continue to the **PIP – Earth Leakage Current Procedure** when you complete the setup.


2
1
Connect AC Power Adapter output to the Power Connector.
AC Power Adapter
Connect AC Power Adapter to the Dale 600 Safety Analyzer plug.
Connect the Dale 600 Safety Analyzer to line power for all tests.

PIP – Instructions

PIP – Earth Leakage Current Procedure

To test Earth Leakage Current:

Note: If you do not have the AC Power Adapter, skip this test.

1. Establish the **PIP – Earth Leakage Current Setup** shown in the figure on the previous page.
2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Earth	Any

3. Verify the AC Power Adapter is on.
4. Verify measured current is less than 2500 µA. Record the results in the **PIP Checklist**.
5. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Open	Normal	Leakage µA	Earth	Any

PIP – Instructions

PIP – Earth Leakage Current Procedure (continued)

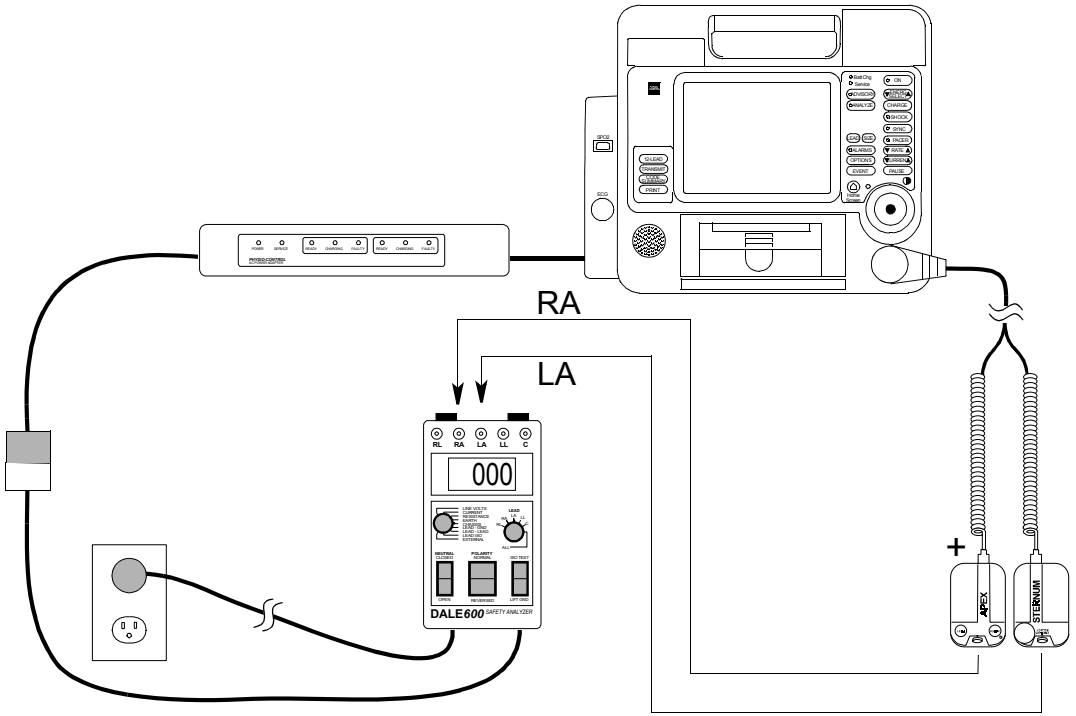
6. Verify measured current is less than 5000 µA. Record the results in the **PIP Checklist**.
7. Continue directly to the next leakage current test.

PIP – Instructions

PIP – Paddles Source Leakage Current Setup

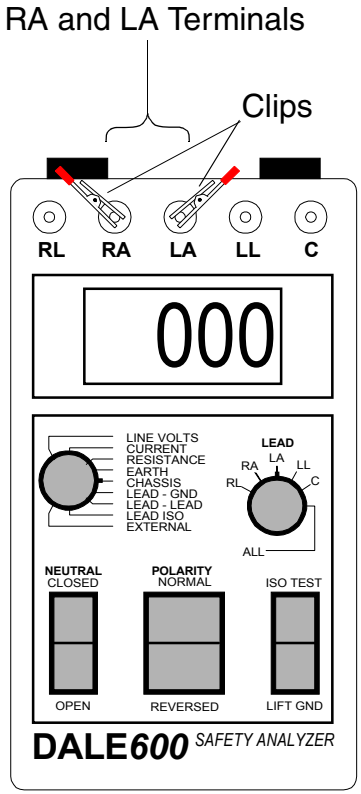
Note: If the UUT is configured for use with QUIK-COMBO therapy electrodes, see **PIP – QUIK-COMBO Source Leakage Current Setup**.

To test the paddles source leakage current, set up the safety analyzer, UUT, and AC Power Adapter as shown below. Continue to the **PIP – Paddles Source Leakage Current Procedure** when you complete the setup.



PIP – Instructions

PIP – Paddles Source Leakage Current Procedure



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To test paddles Source Leakage Current:

Note: If you do not have the AC Power Adapter, skip this test.

1. Establish the **PIP – Paddles Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify the AC Power Adapter is on.
3. Turn on the UUT.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode	Lead
Closed	Normal	Leakage µA Lead – Gnd	All

5. Verify the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify the measured current is less than 50 µA.
8. Release the LIFT GND button.

PIP – Instructions

PIP – Paddles Source Leakage Current Procedure (continued)

9. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Gnd	RA

10. Repeat steps 5 through 8 for the RA lead.

11. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Gnd	LA

12. Repeat steps 5 through 8 for the LA lead.

13. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, insert a battery and then complete this test on battery power.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	LA

PIP – Instructions

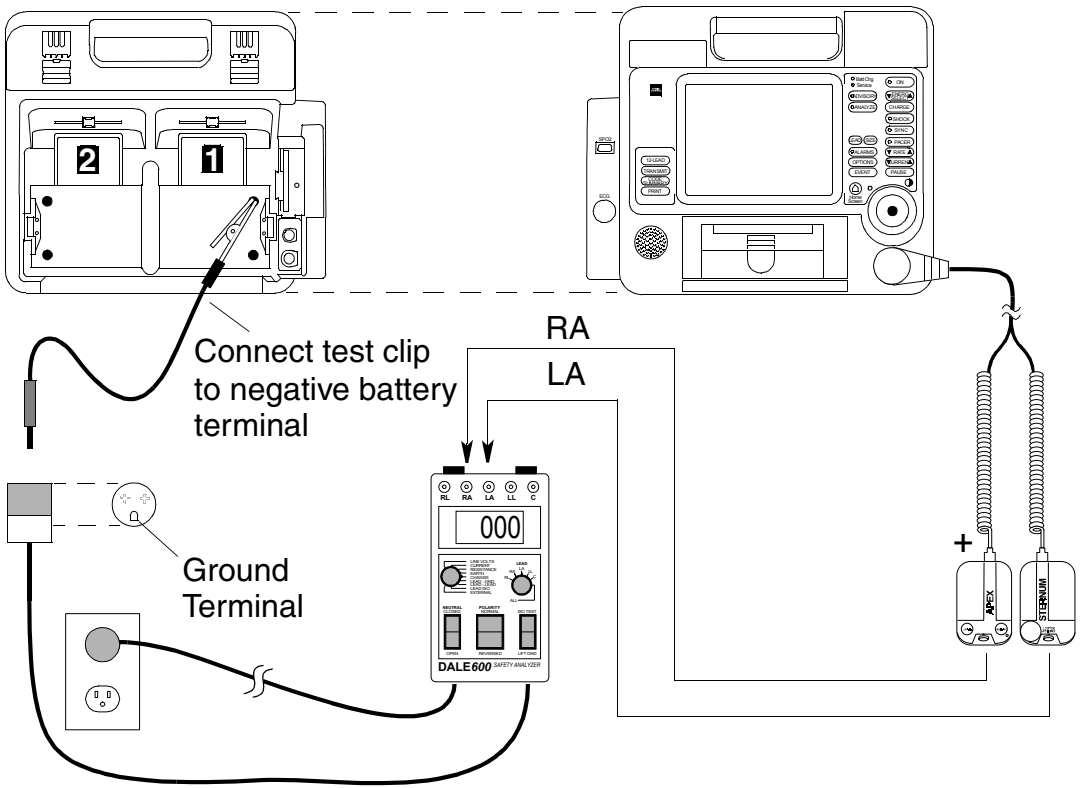
PIP – Paddles Source Leakage Current Procedure (continued)

14. Repeat steps 5 through 8 for lead – lead leakage.
15. Record all results on the **PIP Checklist**.
16. Turn off the UUT.
17. Continue directly to the next leakage current test.

PIP – Instructions

PIP – Paddles Sink Leakage Current Setup

To test the paddles sink leakage current, set up the safety analyzer and UUT as shown below. Continue to the **PIP – Paddles Sink Leakage Current Procedure** when you complete the setup.



PIP – Instructions

PIP – Paddles Sink Leakage Current Procedure

To test Paddles Sink Leakage Current:

1. Establish the **PIP – Paddles Sink Leakage Current Setup** shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or UUT connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead Iso	All

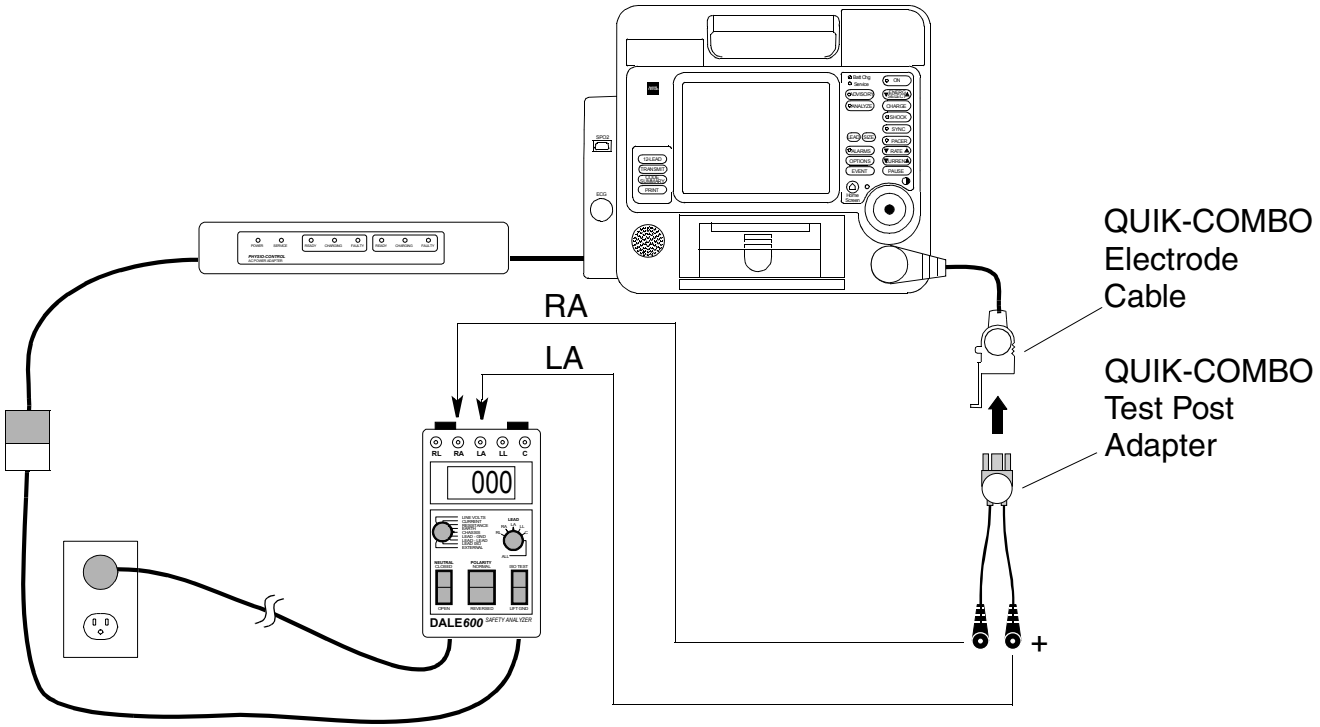
3. Momentarily press the ISO TEST button on the safety analyzer and observe the measured current reading.
4. Release the ISO TEST button.
5. Verify the measured current is less than 100 µA (120 vac) or 500 µA (240 vac). Record the results in the **PIP Checklist**.
6. Continue directly to the next leakage current test.

PIP – Instructions

PIP – QUIK-COMBO Source Leakage Current Setup

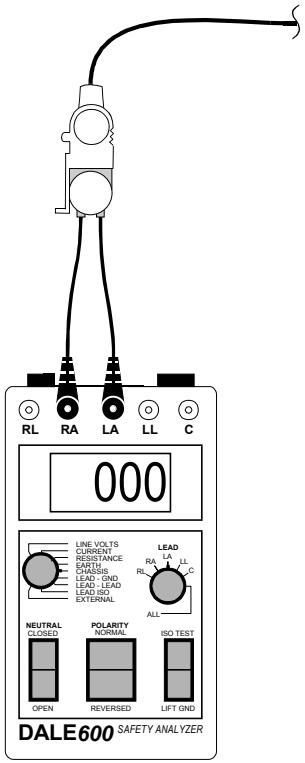
Note: If the UUT is configured for use with Standard Paddles, see **PIP – Paddles Source Leakage Current**.

To test QUIK-COMBO source leakage current, set up the safety analyzer, UUT, and AC Power Adapter as shown below. Continue to the **PIP – QUIK-COMBO Source Leakage Current Procedure** when you complete the setup.



PIP – Instructions

PIP – QUIK-COMBO Source Leakage Current Procedure



To test QUIK-COMBO Source Leakage Current:

Note: If you do not have the AC Power Adapter, skip this test.

1. Establish the **PIP – QUIK-COMBO Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the UUT.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode	Lead
Closed	Normal	Leakage µA Lead – Gnd	All

5. Verify the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify the measured current is less than 50 µA.
8. Release the LIFT GND button.

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PIP – Instructions

PIP – QUIK-COMBO Source Leakage Current Procedure (continued)

9. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Gnd	RA

10. Repeat steps 5 through 8 for the RA lead.
11. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Gnd	LA

12. Repeat steps 5 through 8 for the LA lead.
13. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, install a battery and then complete this test on battery power.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	LA

PIP – Instructions

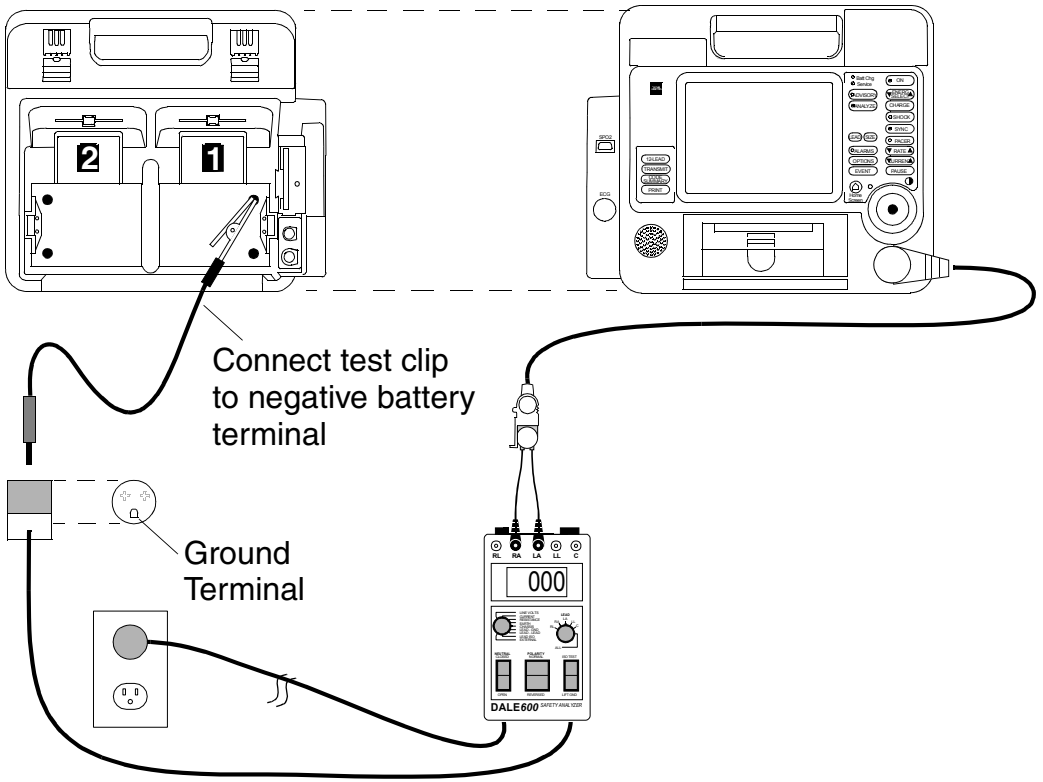
PIP – QUIK-COMBO Source Leakage Current Procedure (continued)

14. Repeat steps 5 through 8 for lead – lead leakage.
15. Record all results on the **PIP Checklist**.
16. Turn off the UUT.
17. Turn off the AC Power Adapter.
18. Continue directly to the next leakage current test.

PIP – Instructions

PIP – QUIK-COMBO Sink Leakage Current Setup

To test the QUIK-COMBO sink leakage current, set up the safety analyzer and UUT as shown below. Continue to the **PIP – QUIK-COMBO Sink Leakage Current Procedure** when you complete the setup.



PIP – Instructions

PIP – QUIK-COMBO Sink Leakage Current Procedure

To test QUIK-COMBO Sink Leakage Current:

1. Establish the **PIP – QUIK-COMBO Sink Leakage Current Setup** shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or UUT connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead Iso	All

3. Momentarily press the ISO TEST button on the safety analyzer and observe the measured current reading.
4. Release the ISO TEST button.
5. Verify the measured current is less than 50 µA (120 vac) or 100 µA (240 vac). Record the results on the **PIP Checklist**.
6. Continue directly to the next leakage current test.

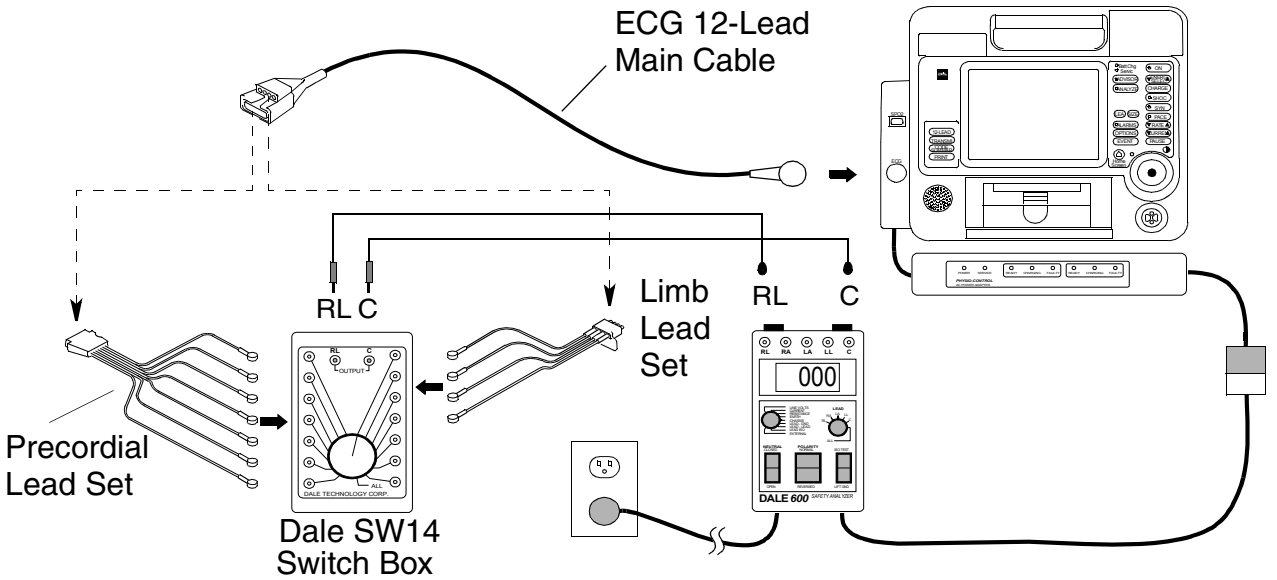
PIP – Instructions

PIP – ECG 12-Lead Source Leakage Current Setup

Note: If the device is not configured with a 12-LEAD control, perform the **PIP – 3-Lead ECG Leakage Current** test instead of this test.

Note: If the Dale SW14 switch box is not available, perform the **PIP Alternative ECG 12-Lead Source Leakage Current Test Procedure**.

To test the ECG 12-Lead source leakage current, set up the safety analyzer, UUT, and AC Power Adapter as shown below. Continue to the **PIP – ECG 12-Lead Source Leakage Current Procedure** when you complete the setup.



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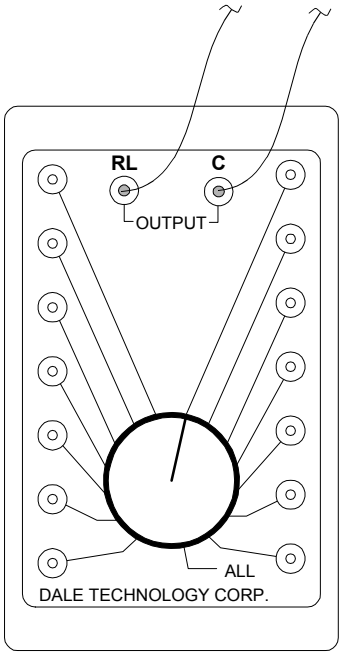
PIP – Instructions

PIP – ECG 12-Lead Source Leakage Current Procedure



To test ECG 12-Lead Source Leakage Current:

Note: If you do not have the AC Power Adapter, skip this test.

1. Establish the **PIP – ECG 12-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Turn on the UUT.
3. Set the safety analyzer controls to:

Neutral	Polarity	Mode	Lead
Closed	Normal	Leakage µA Lead – Gnd	RL

4. Set the Dale SW14 Switch Box control to ALL.
5. Verify the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify the measured current is less than 50 µA.
8. Release the LIFT GND button.
9. Repeat steps 5 through 8 for each switch setting (RL, RA, LA, LL, V1, V2, V3, V4, V5, and V6) on the Dale SW14 switch box. Record all results on the **PIP Checklist**.

PIP – Instructions

PIP – ECG 12-Lead Source Leakage Current Procedure (continued)

10. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Closed	Reversed	Leakage µA	Lead – Gnd	RL

11. Set the Dale SW14 Switch Box control to ALL.
12. Verify the measured current is less than 10 µA.
13. Press the LIFT GND button on the safety analyzer.
14. Verify the measured current is less than 50 µA.
15. Release the LIFT GND button.
16. Repeat Steps 12 through 15 for each switch setting (RL, RA, LA, LL, V1, V2, V3, V4, V5, and V6) on the switch box. Record all results on the **PIP Checklist**.
17. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, install a battery and then complete this test on battery power.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	RL

PIP – Instructions

PIP – ECG 12-Lead Source Leakage Current Procedure (continued)

18. Set the Dale SW14 Switch Box control to V6.
19. Verify that the measured current is less than 10 µA.
20. Press the LIFT GND button on the safety analyzer.
21. Verify that the measured current is less than 50 µA.
22. Release the LIFT GND button.
23. Repeat steps 19 through 22 for each switch setting (RL, RA, LA, LL, V1, V2, V3, V4, and V5) on the switch box. Record all results on the **PIP Checklist**.
24. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, install a battery and then complete this test on battery power.

Neutral	Polarity	Mode		Lead
Closed	Reversed	Leakage µA	Lead – Lead	RL

25. Set the Dale SW14 Switch Box control to V6.
26. Verify that the measured current is less than 10 µA.

PIP – Instructions

PIP – ECG 12-Lead Source Leakage Current Procedure (continued)

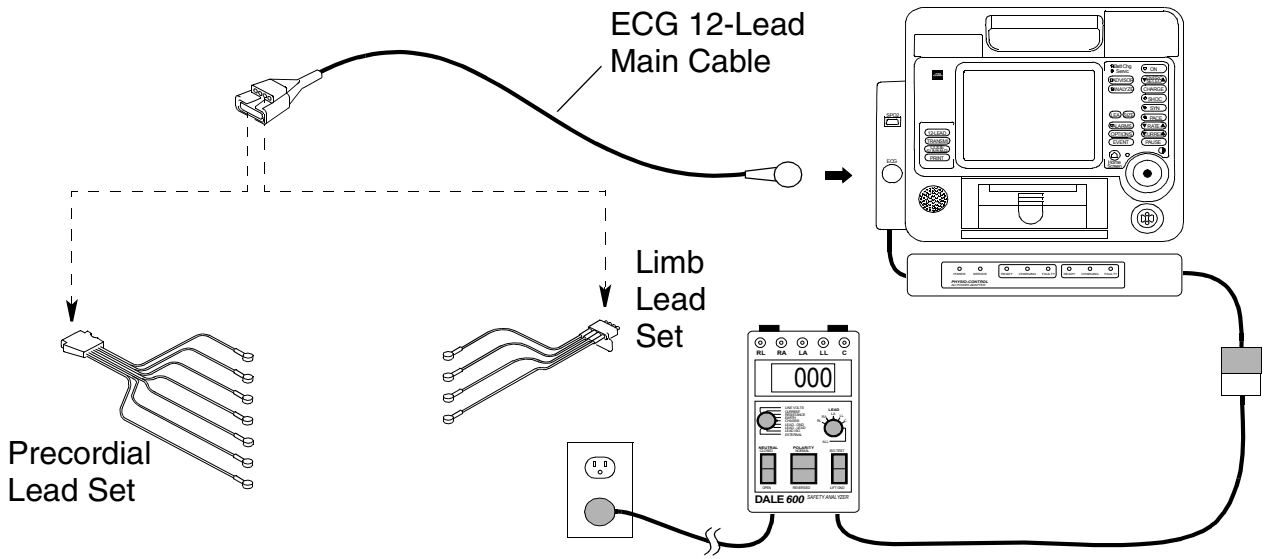
27. Press the LIFT GND button on the safety analyzer.
28. Verify that the measured current is less than 50 µA.
29. Release the LIFT GND button.
30. Repeat Steps 26 through 29 for each switch setting (RL, RA, LA, LL, V1, V2, V3, V4, and V5) on the Dale SW14 switch box. Record all results on the **PIP Checklist**.
31. Turn off the UUT.
32. Disconnect the AC Power Adapter from the UUT and from line power.
33. Continue directly to the next leakage current test.

PIP Instructions

PIP - Alternate ECG 12-Lead Source Leakage Current Setup

If the Dale SW14 Switch Box is not available, use this procedure to test 12-Lead source leakage.

Set up the safety analyzer, UUT, and the AC Power Adapter as shown below. Continue to the PIP - Alternate ECG 12–Lead Source Leakage Current Procedure when you complete the setup.



PIP Instructions

PIP - Alternate ECG 12-Lead Source Leakage Current Procedure

To test ECG 12–Lead Source Leakage Current:

Note: If you do not have the AC Power Adapter, skip this test.

1. Establish the PIP ECG 12–Lead Source Leakage Current Setup shown in the figure on the previous page.
2. Turn on the UUT.
3. Using clip-lead jumpers, connect all of the limb lead and precordial lead snaps together, and connect them to the RL snap on the safety analyzer. Leave the C lead disconnected for this step.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Ground	RL

5. Verify that the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify that the measured current is less than 50 µA.
8. Release the LIFT GND button.

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PIP Instructions

PIP - Alternate ECG 12-Lead Source Leakage Current Procedure (continued)

9. Remove the clip-lead jumpers, shorting the lead snaps together.
10. Connect any patient lead to the C snap on the safety analyzer.
11. Connect each of the other patient leads individually to the RA terminal of the safety analyzer. Repeat steps 5 through 8 for each lead. Record all results on the **PIP Checklist**.
12. Using clip-lead jumpers, connect all of the limb lead and precordial lead snaps together, and connect them to the RL snap on the safety analyzer.
13. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Closed	Reversed	Leakage µA	Lead – Ground	RL

14. Verify that the measured current is less than 10 µA.
15. Press the LIFT GND button on the safety analyzer.
16. Verify that the measured current is less than 50 µA.
17. Release the LIFT GND button.

PIP Instructions

PIP - Alternate ECG 12-Lead Source Leakage Current Procedure (continued)

18. Remove the clip-lead jumpers, shorting the lead snaps together.
19. Connect any patient lead to the C snap on the safety analyzer.
20. Connect each of the other patient leads individually to the RL snap on the safety analyzer. Repeat steps 14 through 17 for each lead. Record all results on the **PIP Checklist**.
21. Disconnect the lead wire from the C snap on the safety analyzer.
22. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, install a battery and then complete this test on battery power.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	RL

23. Connect the V6 lead to the C snap to the safety analyzer.
24. Verify that the measured current is less than 10 µA.
25. Press the LIFT GND button on the safety analyzer.
26. Verify that the measured current is less than 50 µA.
27. Release the LIFT GND button.

PIP Instructions

PIP - Alternate ECG 12-Lead Source Leakage Current Procedure (continued)

28. Connect each of the other patient leads individually to the RL snap on the safety analyzer. Repeat steps 24 through 27 for each lead. Record all results on the **PIP Checklist**.
29. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, install a battery and then complete this test on battery power.

Neutral	Polarity	Mode		Lead
Closed	Reversed	Leakage µA	Lead – Lead	RL

30. Connect the V6 lead to the C snap on the safety analyzer.
31. Verify that the measured current is less than 10 µA.
32. Press the LIFT GND button on the safety analyzer.
33. Verify that the measured current is less than 50 µA.
34. Release the LIFT GND button.
35. Connect each of the other patient leads individually to the RL snap on the safety analyzer. Repeat steps 31 through 34 for each lead. Record all results on the **PIP Checklist**.

PIP Instructions

PIP - Alternate ECG 12-Lead Source Leakage Current Procedure (continued)

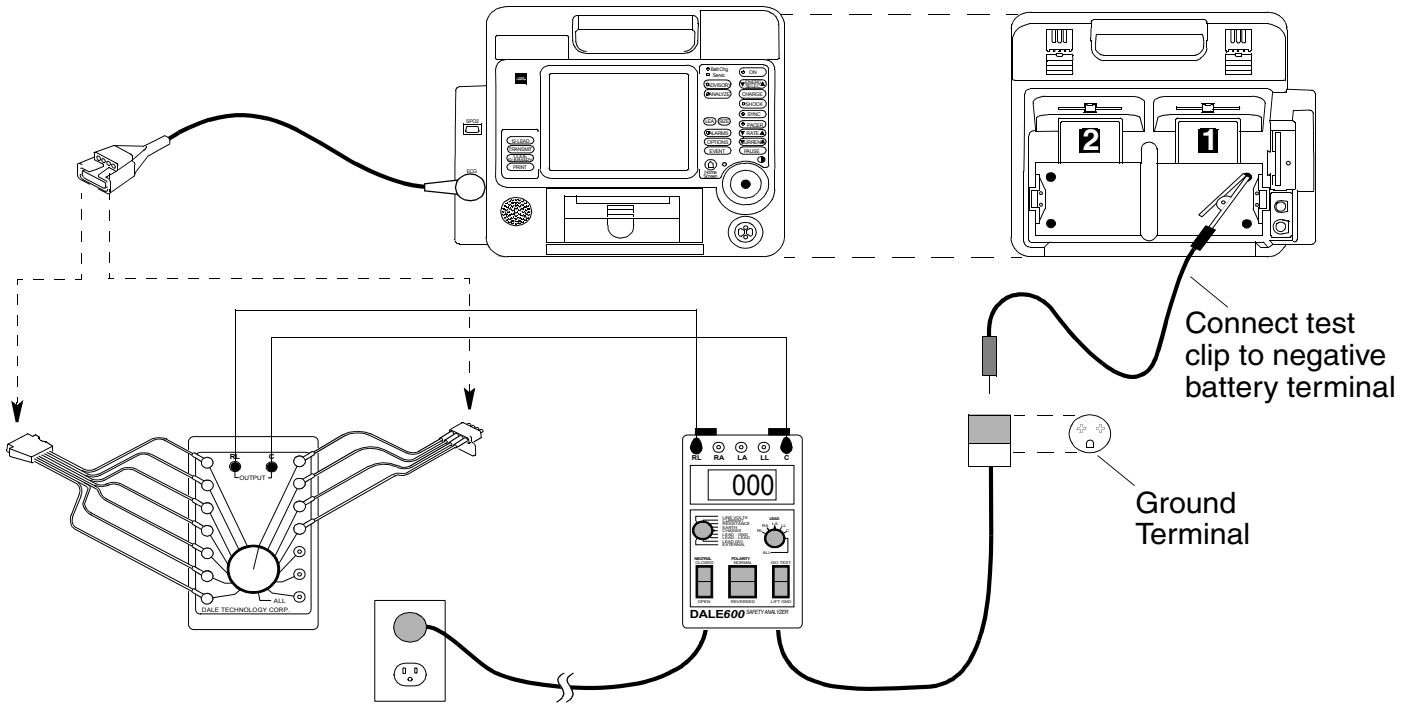
36. Turn off the UUT.
37. Disconnect the AC Power Adapter from the UUT and from line power.
38. Continue directly to PIP Alternate ECG 12-Lead Sink Leakage Current Setup.

PIP – Instructions

PIP – ECG 12-Lead Sink Leakage Current Setup

To test the ECG 12-Lead Sink Leakage Current, set up the safety analyzer and UUT as shown below. Continue to the **PIP – ECG 12-Lead Sink Leakage Current Procedure** when you complete the setup.

Note: If the Dale SW14 switch box is not available, perform the **PIP Alternative ECG 12-Lead Sink Leakage Current Test Procedure**.



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PIP – Instructions

PIP – ECG 12-Lead Sink Leakage Current Procedure

To test ECG 12-Lead Sink Leakage Current:

1. Establish the **PIP – ECG 12-Lead Sink Leakage Current Setup** shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or UUT connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode	Lead
Closed	Normal	Leakage µA Lead Iso	All

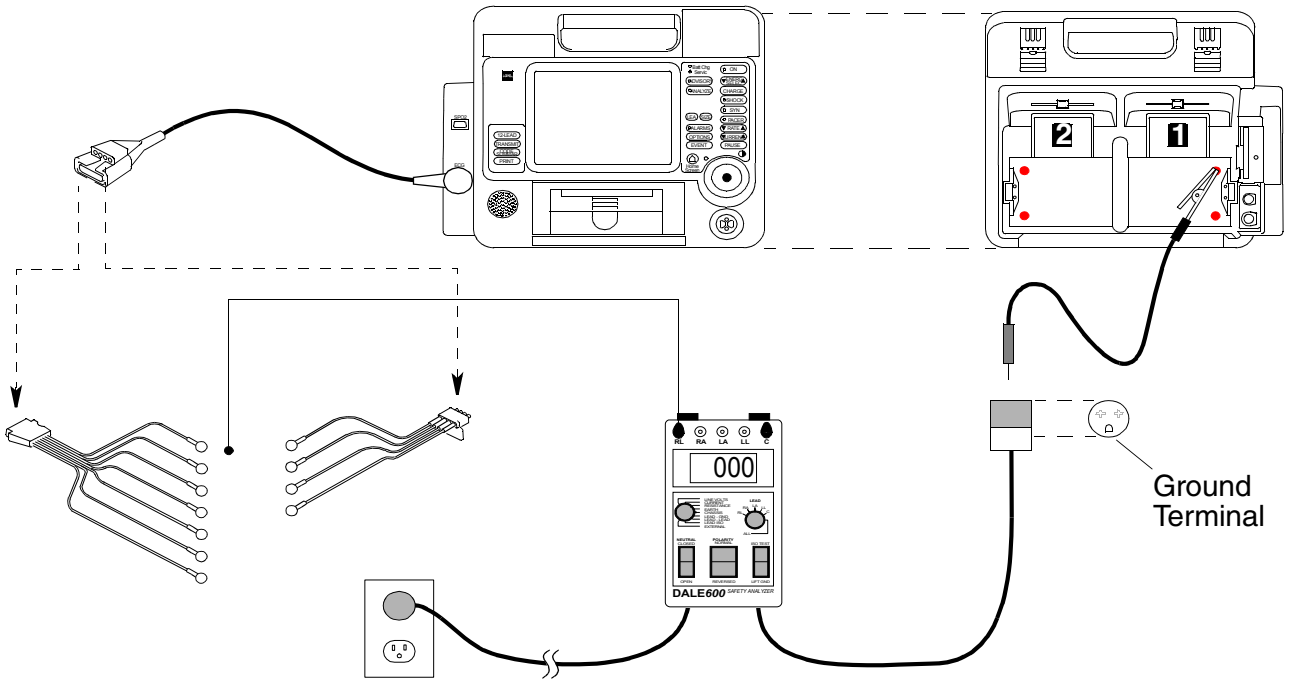
3. On the Dale SW14 Switch Box set the control to ALL.
4. Momentarily press the ISO TEST button on the analyzer and observe the current reading.
5. Release the ISO TEST button.
6. Verify the measured current is less than 50 µA. Record the results on the **PIP Checklist**.
7. Continue directly to the next leakage current test.

PIP - Instructions

PIP - Alternate ECG 12-Lead Sink Leakage Current Setup

If the Dale SW14 Switch Box is not available, use this procedure to test sink leakage.

Set up the safety analyzer and the UUT as shown below. Continue to the PIP – Alternate ECG 12-Lead Sink Leakage Current Procedure when you complete the setup.



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PIP - Instructions

PIP - Alternate ECG 12-Lead Sink Leakage Current Procedure

To test ECG 12-Lead Sink Leakage Current:

1. Establish the PIP – ECG 12-Lead Sink Leakage Current Setup shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or UUT connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead ISO	All

3. Using clip-lead jumpers, connect all of the limb lead and precordial lead snaps together, and connect them to the RL snap on the safety analyzer.

4. Momentarily press the ISO TEST button on the safety analyzer, and observe the current reading.

5. Release the ISO TEST button.

PIP - Instructions

PIP - Alternate ECG 12-Lead Sink Leakage Current Procedure (continued)

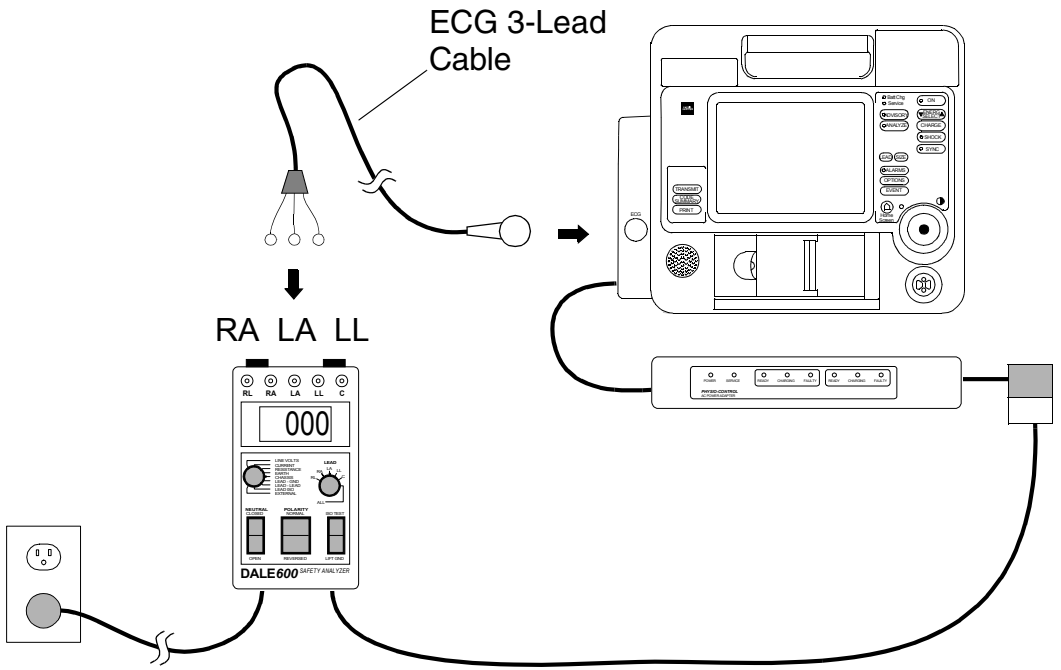
6. Verify that the measured current is less than 50 µA. Record the results on the **PIP Checklist**.
7. Continue to the next leakage current test.

PIP – Instructions

PIP – ECG 3-Lead Source Leakage Current Setup

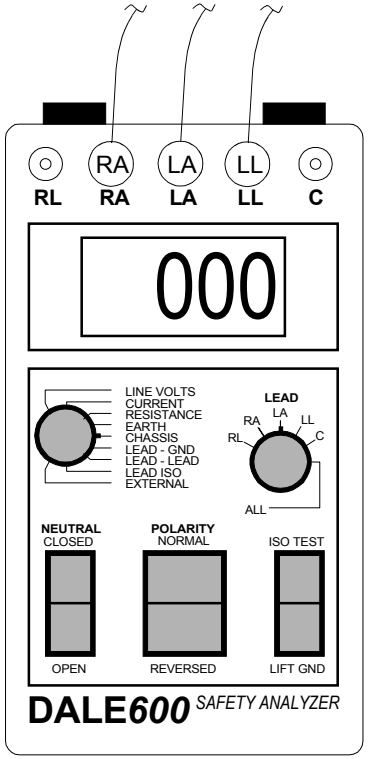
Note: If the UUT is configured with a 12-LEAD control, perform the **PIP – ECG 12-Lead Source Leakage Current** test instead of this test.

To test the ECG 3-Lead Source Leakage Current, set up the safety analyzer, UUT, and AC Power Adapter as shown below. Continue to the **PIP – ECG 3-Lead Source Leakage Current Procedure** when you complete the setup.



PIP – Instructions

PIP – ECG 3-Lead Source Leakage Current Procedure



To test ECG 3-Lead Source Leakage Current:

Note: If you do not have the AC Power Adapter, skip this test.

1. Establish the **PIP – ECG 3-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Turn on the UUT.
3. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Gnd	ALL

4. Verify that the measured current is less than 10 µA. Record the results in the **PIP Checklist**.
5. Press the LIFT GND button on the safety analyzer.
6. Verify that the measured current is less than 50 µA. Record the results on the PIP Checklist.
7. Release the LIFT GND button.

PIP – Instructions

PIP – ECG 3-Lead Source Leakage Current Procedure (continued)

8. Repeat steps 5 through 8 for the remaining RA, LA, and LL leads.
9. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Closed	Reversed	Leakage µA	Lead – Gnd	ALL

10. Verify that the measured current is less than 10 µA.
11. Press the LIFT GND button on the safety analyzer.
12. Verify that the measured current is less than 50 µA.
13. Release the LIFT GND button.
14. Repeat steps 10 through 14 for the remaining RA, LA, and LL leads. Record all results on the **PIP Checklist**.
15. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, install a battery and then complete this test on battery power.

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	RA

PIP – Instructions

PIP – ECG 3-Lead Source Leakage Current Procedure (continued)

16. Verify that the measured current is less than 10 µA.
17. Press the LIFT GND button on the safety analyzer.
18. Verify that the measured current is less than 50 µA.
19. Release the LIFT GND button.
20. Repeat steps 16 through 20 for the remaining LA and LL leads. Record all results on the **PIP Checklist**.
21. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, install a battery and then complete this test on battery power.

Neutral	Polarity	Mode		Lead
Closed	Reversed	Leakage µA	Lead – Lead	RA

22. Verify that the measured current is less than 10 µA.
23. Press the LIFT GND button on the safety analyzer.
24. Verify that the measured current is less than 50 µA.

PIP – Instructions

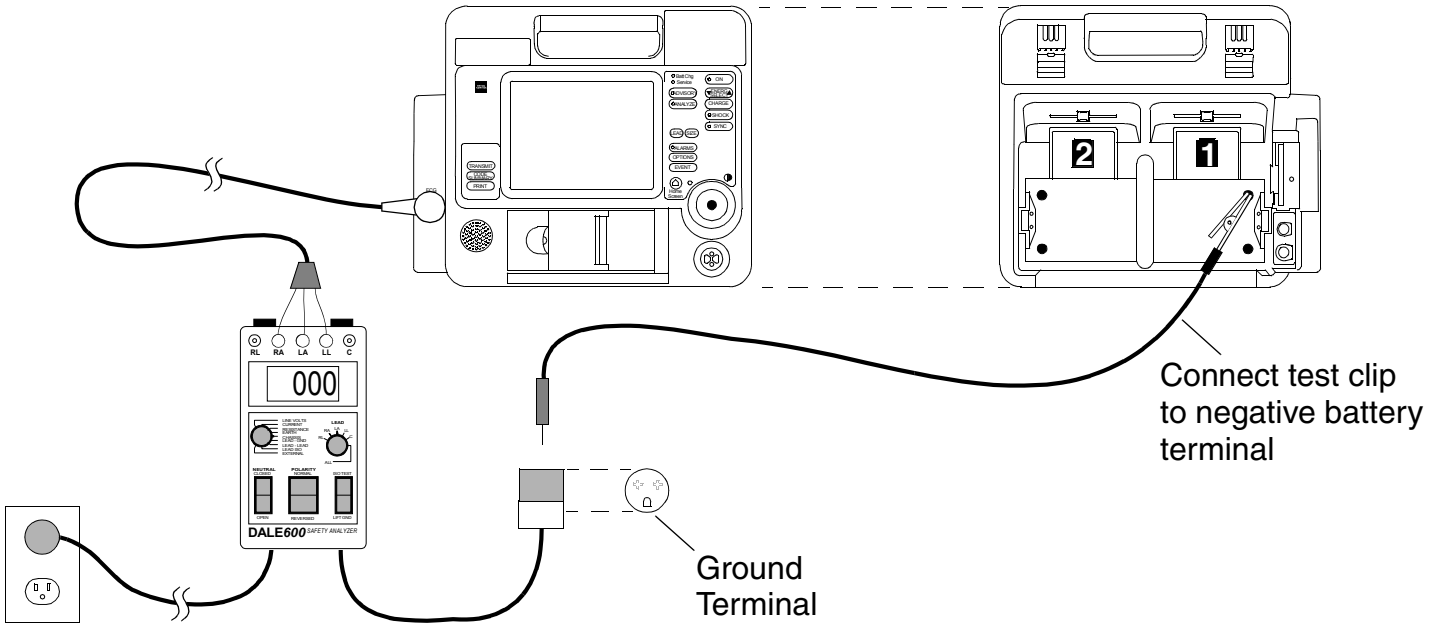
PIP – ECG 3-Lead Source Leakage Current Procedure (continued)

25. Release the LIFT GND button.
26. Repeat steps 22 through 26 for the remaining LA and LL leads. Record all results on the **PIP Checklist**.
27. Turn off the UUT.
28. Disconnect the AC Power Adapter from the UUT and from line power.
29. Continue directly to the next leakage current test.

PIP – Instructions

PIP – ECG 3-Lead Sink Leakage Current Setup

To test the ECG 3-Lead Sink Current, set up the safety analyzer and UUT as shown below. Continue to the **PIP – ECG 3-Lead Sink Leakage Current Procedure** when you complete the setup.



PIP – Instructions

PIP – ECG 3-Lead Sink Leakage Current Procedure

To test ECG 3-Lead Sink Leakage Current:

1. Establish the **PIP – ECG 3-Lead Sink Leakage Current Setup** shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or UUT connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead Iso	All

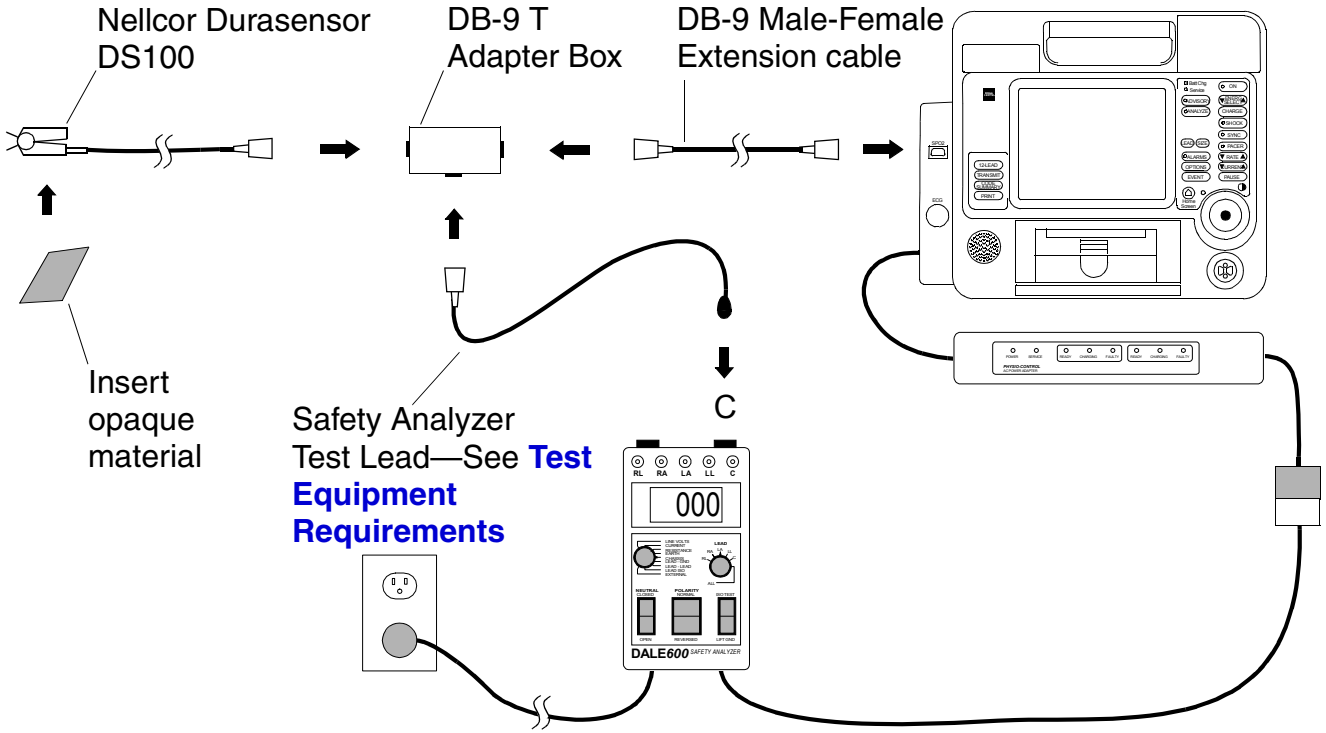
3. Momentarily press the ISO TEST button on the safety analyzer and observe the current reading.
4. Release the ISO TEST button.
5. Verify that the measured current is less than 50 µA. Record the results on the **PIP Checklist**.
6. Continue directly to the next leakage current test.

PIP – Instructions

PIP – SpO2 Source Leakage Current Setup

Note: Complete the following only for UUTs equipped with the SpO2 option.

To test SpO2 Source Leakage Current, set up the safety analyzer, UUT, and AC Power Adapters as shown below. Continue to the **PIP – SpO2 Source Leakage Current Procedure** when you complete the setup.



PIP – Instructions

PIP – SpO2 Source Leakage Current Procedure

To test SpO2 Source Leakage Current:

Note: If you do not have the AC Power Adapter, skip this test.

1. Establish the **PIP – SpO2 Source Leakage Current Setup** shown in the figure on the previous page.
2. Turn on the UUT.
3. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Gnd	C

4. Verify that the measured current is less than 10 µA (120 vac) or 100 µA (240 vac). Record the results on the **PIP Checklist**.
5. Press the LIFT GND button on the safety analyzer.
6. Verify that the measured current is less than 50 µA (120 vac) or 500 µA (240 vac). Record the results in the **PIP Checklist**.
7. Release the LIFT GND button.

PIP – Instructions

PIP – SpO2 Source Leakage Current Procedure (continued)

8. Set the safety analyzer controls to:

Note: If you do not have the AC Power Adapter, skip this test.

Neutral	Polarity	Mode		Lead
Closed	Reverse	Leakage µA	Lead – Gnd	C

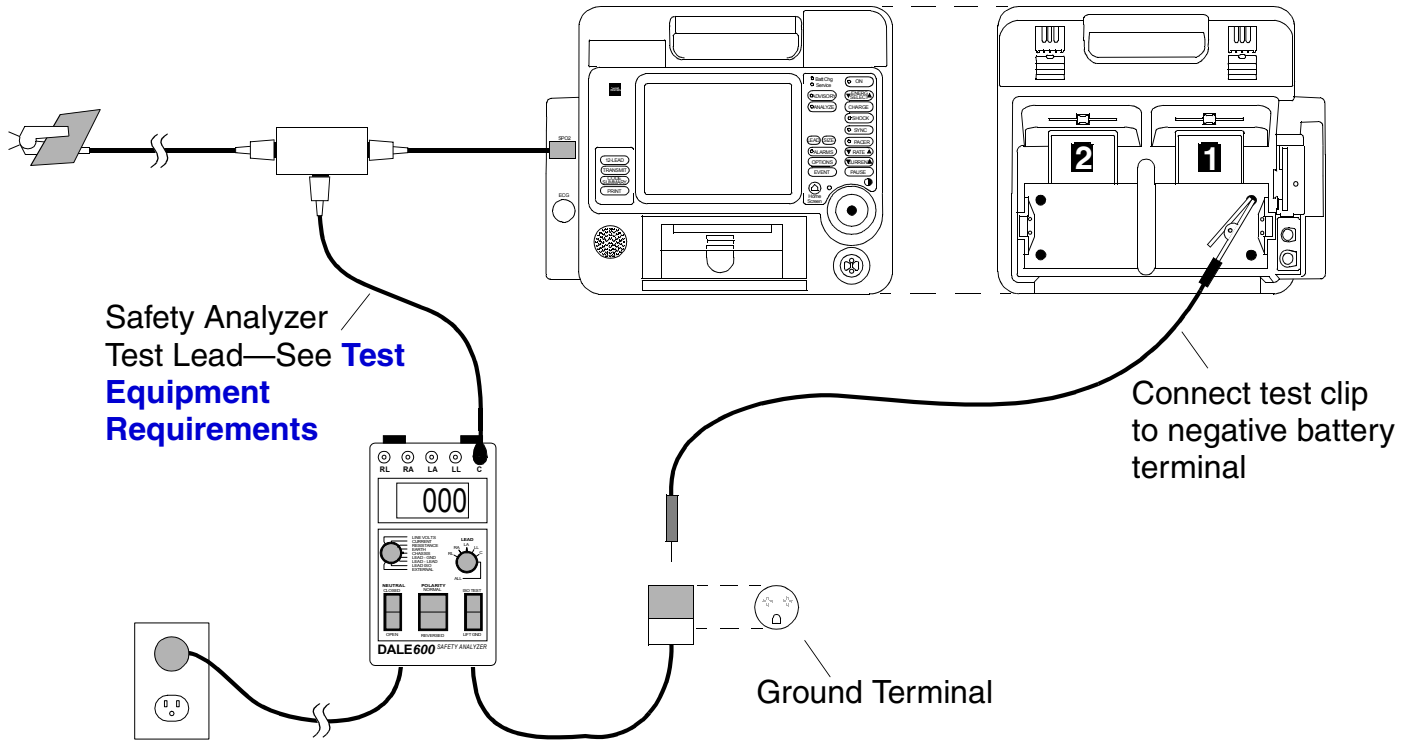
9. Repeat Steps 4 through 8.
10. Record all results on the **PIP Checklist**.
11. Turn off the UUT.
12. Continue directly to the next leakage current test.

PIP – Instructions

PIP – SpO2 Sink Leakage Current Setup

Note: Complete the following only for UUTs equipped with the SpO2 option.

To test SpO2 Source Leakage Current, set up the safety analyzer and UUT as shown below. Continue to the **PIP – SpO2 Sink Leakage Current Procedure** when you complete the setup.



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PIP – Instructions

PIP – SpO2 Sink Leakage Current Procedure

To test SpO2 Sink Leakage Current:

1. Establish the **PIP – SpO2 Sink Leakage Current Setup** shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or UUT connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead Iso	C

3. Momentarily press the ISO TEST button on the safety analyzer and observe the measured current reading.
4. Release the ISO TEST button.
5. Verify that the measured current is less than 100 µA (120 vac) or 500 µA (240 vac).
6. Record the results on the **PIP Checklist**.

PIP – Summary of Leakage Current Specifications

The following summarizes leakage current specifications. NC=Normal Condition SFC = Single Fault Condition

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
Chassis Leakage	Positive Battery	NC: 100 µA	NC: 100 µA
	Terminal	SFC: 300 µA	SFC: 500 µA
	Negative Battery	NC: 100 µA	NC: 100 µA
	Terminal	SFC: 300 µA	SFC: 500 µA
	Contact	NC: 100 µA	NC: 100 µA
		SFC: 300 µA	SFC: 500 µA
Earth Leakage	Closed Neutral	2500 µA	2500 µA
	Open Neutral	5000 µA	5000 µA
Paddles Source LEAD-GND	All–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	RA–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

PIP – Summary of Leakage Current Specifications

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
Paddles Source LEAD-GND	LA–GND	NC: 10 µA	NC: 10 µA
(continued)		SFC: 50 µA	SFC: 50 µA
Paddles Source LEAD-LEAD	RA or LA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
Paddles Sink Leakage	ISO Test	100 µA	500 µA
QUIK-COMBO Source LEAD-GND	All–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	RA–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	LA–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

PIP – Summary of Leakage Current Specifications

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
QUIK-COMBO Source LEAD-LEAD	RA or LA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
QUIK-COMBO SInk Leakage	ISO Test	50 µA	100 µA
12-Lead ECG Source LEAD-GND	All-GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	RA-GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	RL-GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	LA–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

PIP – Summary of Leakage Current Specifications

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
12-Lead ECG Source LEAD-GND (continued)	LL–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V1–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V2–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V3–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V4–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V5–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

PIP – Summary of Leakage Current Specifications

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
	V6–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
12-Lead ECG Source LEAD-LEAD	RA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	LA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	RL	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	LL	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V1	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

PIP – Summary of Leakage Current Specifications

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer@ 120 vac**	**Analyzer @ 240 vac**
12-Lead ECG Source LEAD-LEAD (continued)	V2	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V3	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V4	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V5	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V6	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
12-Lead ECG Sink Leakage	ISO Test	50 µA	50 µA

PIP – Summary of Leakage Current Specifications

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
3-Lead ECG Source LEAD-GND	All–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	RA–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	LA–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	RL–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
3-Lead ECG Source LEAD-LEAD	RA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	LA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

PIP – Summary of Leakage Current Specifications

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer@ 120 vac**	**Analyzer @ 240 vac**
3-Lead ECG Source LEAD-LEAD	RL	NC: 10 µA	NC: 10 µA
(continued)		SFC: 50 µA	SFC: 50 µA
3-Lead ECG Sink Leakage	ISO Test	50 µA	50 µA
SpO2 Source LEAD-GND	SpO2	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
SpO2 Sink Leakage	ISO Test	100 µA	500 µA

PIP – LP12 Maintenance Instruction

Disabling or Resetting the Maintenance Due Indicator

1. Enter the SERVICE MODE (refer to the Modes of Operation section of this service manual CD).
2. Select the MAINT PROMPT… menu option.
3. Select INTERVAL, and choose OFF to disable the maintenance prompt. If a maintenance prompt is desired, Select INTERVAL, and make the appropriate selection. The maintenance interval timer resets to the selected interval.
4. Turn the UUT off.
5. Record all results on the **PIP Checklist**.

PIP – Power Adapter Instructions

PIP – AC Power Adapter

1. Connect the AC Power Adapter under test (UUT) to line power.
2. Verify that the green POWER LED turns on.

Note: When the power adapter is first turned on, it performs a brief self-test. During this test all LEDs turn on for a few seconds. If the test is successful, all the LEDs turn off, with the exception of the green POWER LED.

3. Connect the output cable to the Auxiliary Connector at the rear of a LIFEPAK 12 defibrillator/monitor. See the **Operating Instructions – AC and DC Power Adapters** for more information.
4. Install two charged batteries into the LIFEPAK 12 defibrillator/monitor.
5. Verify that the CHARGING indicator for either Battery 1 or Battery 2 is backlit.

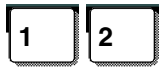
Note: If the batteries are installed in the defibrillator, the power adapter LEDs illuminate as follows:

- READY (green): battery is fully charged.
- CHARGING (amber): battery is charging
- FAIL (red): discard/ recycle batteries
- SERVICE (red): power adapter needs service immediately. Remove power adapter from use immediately.

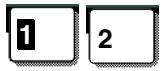
PIP – Power Adapter Instructions

PIP – AC Power Adapter (continued)

6. Turn on the LIFEPAK 12 defibrillator/monitor.
7. Verify that the battery icons appear on the display, but neither is highlighted.



8. Unplug the Power Adapter cable from the LIFEPAK 12 defibrillator/monitor.
9. Verify that one of the battery icons on the monitor display is highlighted.



10. Record the results on the **PIP Checklist**.
11. Turn off the LIFEPAK 12 defibrillator/monitor and remove both batteries.
12. Plug the Power Adapter into the LIFEPAK 12 defibrillator/monitor, and turn the LIFEPAK 12 defibrillator/monitor on.
13. Press ENERGY SELECT and choose a level of 360 J.
14. Press CHARGE and note the charging cycle is 10 seconds or less.
15. Record the results on the **PIP Checklist**.
16. Turn off the LIFEPAK 12 defibrillator/monitor. Continue to the next test.

PIP – Power Adapter Instructions

PIP – DC Power Adapter

1. Connect vehicle battery cables to the DC Power Adapter under test (UUT).
2. Press the power switch to the ON position. Verify that the green POWER LED turns on.

Note: When the power adapter is first turned on, it performs a brief self-test. During this test all LEDs turn on for a few seconds. If the test is successful, all the LEDs turn off, with the exception of the green POWER LED.

3. Connect the output cable to the Auxiliary Connector at the rear of a LIFEPAK 12 defibrillator/monitor. See the **Operating Instructions – AC and DC Power Adapters** for more information.
4. Install two charged batteries into the LIFEPAK 12 defibrillator/monitor. Verify that the CHARGING indicator for either Battery 1 or Battery 2 is backlit.

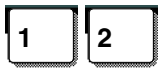
Note: If the batteries are installed in the defibrillator, the power adapter LEDs illuminate as follows:

- READY (green): battery is fully charged.
- CHARGING (amber): battery is charging
- FAIL (red): discard/ recycle batteries
- SERVICE (red): power adapter needs service immediately. Remove power adapter from use immediately.

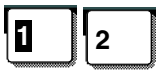
PIP – Power Adapter Instructions

PIP – DC Power Adapter (continued)

5. Turn on the LIFEPAK 12 defibrillator/monitor.
6. Verify that the battery icons appear on the display, but neither is highlighted.



7. Unplug the Power Adapter cable from the LIFEPAK 12 defibrillator/monitor.
8. Verify that one of the battery icons on the monitor display is highlighted.

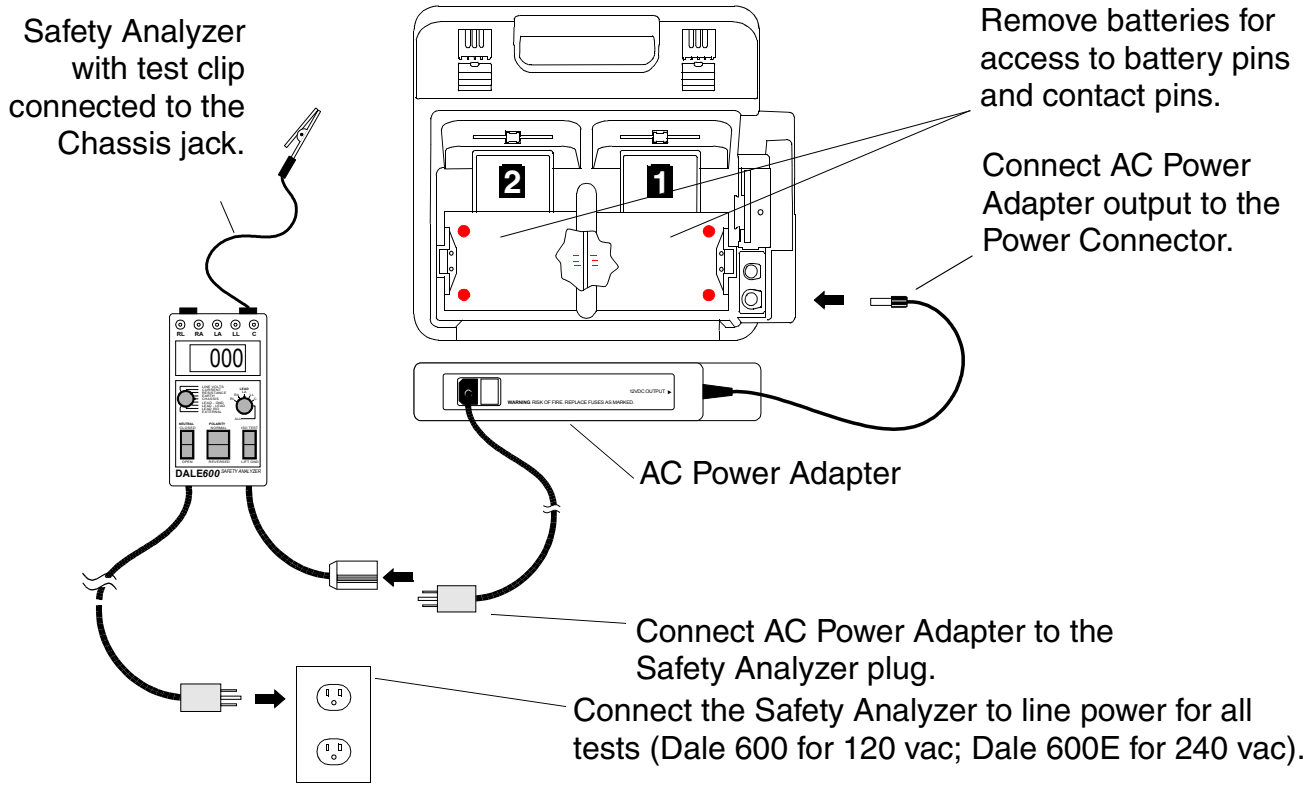


9. Record the results on the **PIP Checklist**.
10. Turn off the LIFEPAK 12 defibrillator/monitor and remove both batteries.

PIP – Power Adapter Instructions

PIP – AC Power Adapter Chassis Leakage Current Setup

To test AC Power Adapter chassis leakage current, set up the safety analyzer, AC Power Adapter (UUT), and LIFEPAK 12 defibrillator/monitor as shown below. Continue to the **PIP – AC Power Adapter Chassis Leakage Current Procedure** when you complete the setup.


Safety Analyzer with test clip connected to the Chassis jack.
Remove batteries for access to battery pins and contact pins.
Connect AC Power Adapter output to the Power Connector.
2
1
000
DALE600
AC Power Adapter
Connect AC Power Adapter to the Safety Analyzer plug.
Connect the Safety Analyzer to line power for all tests (Dale 600 for 120 vac; Dale 600E for 240 vac).

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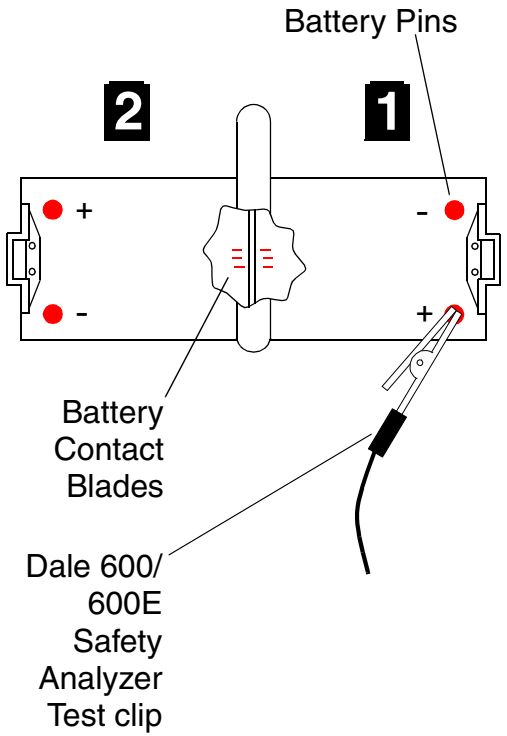
PIP – Power Adapter Instructions

PIP – AC Power Adapter Chassis Leakage Current Procedure



Note: AC Power Adapter Chassis Leakage Current test results are summarized in the **Leakage Current Specifications Summary Table**.

To test AC Power Adapter Chassis Leakage Current:

1. Establish the **PIP – AC Power Adapter Chassis Leakage Current Setup** shown in the figure on the previous page. The LIFEPAK 12 is off for this test.
2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Chassis	All

3. Verify the AC Power Adapter (UUT) is on.
4. Connect the analyzer clip to the positive (+) battery terminal of Battery Well 1 as shown at the left.
5. Verify measured current is less than 100 µA.
6. Press the LIFT GND button on the safety analyzer.

PIP – Power Adapter Instructions

PIP – AC Power Adapter Chassis Leakage Current Procedure (continued)

7. Verify measured current is less than 300 µA (120 vac) or less than 500 µA (240 vac).
8. Release the LIFT GND button and set the safety analyzer controls to:

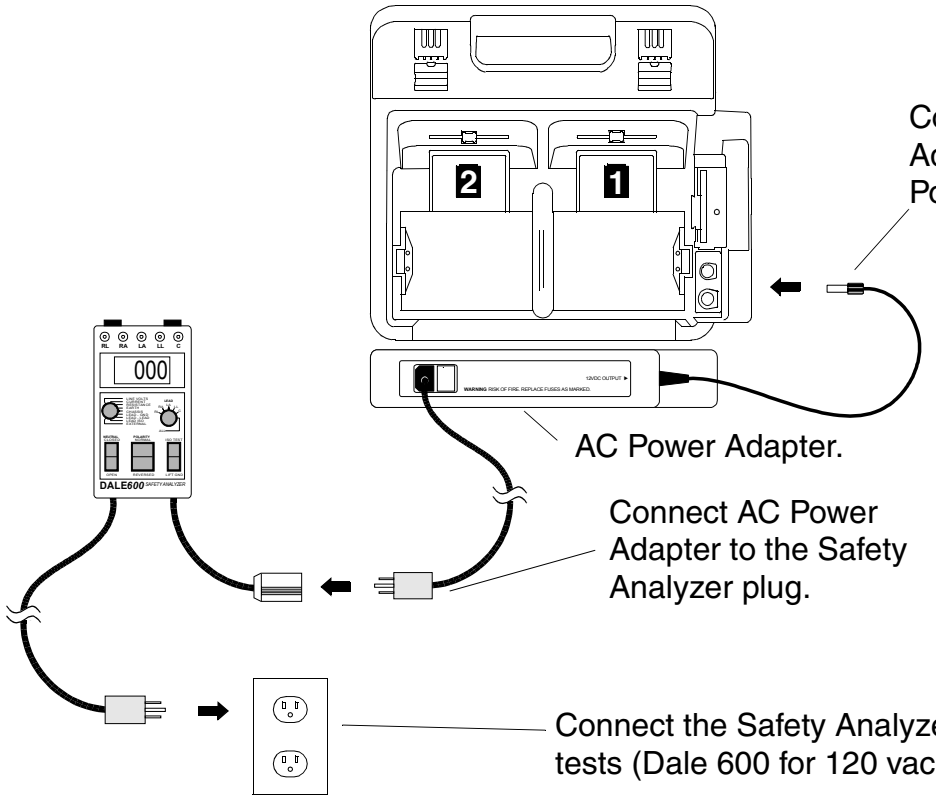
Neutral	Polarity	Mode		Lead
Closed	Reversed	Leakage µA	Lead – Chassis	All

9. Verify measured current is less than 100 µA.
10. Press the LIFT GND button on the safety analyzer.
11. Verify measured current is less than 300 µA (120 vac) or less than 500 µA (240 vac).
12. Release the LIFT GND button on the safety analyzer.
13. Repeat steps 4 through 12 for the three remaining battery pins and all six battery contact blades on the A07 Contact PCB.
14. Record all results on the **PIP Checklist**.
15. Continue directly to the next leakage current test.

PIP – Power Adapter Instructions

PIP – AC Power Adapter Earth Leakage Current Setup

To test AC Power Adapter earth leakage current, set up the safety analyzer, AC Power Adapter (UUT), and LIFEPAK 12 defibrillator/monitor as shown below. Continue to the **PIP – AC Power Adapter Earth Leakage Current Procedure** when you complete the setup.


2
1
Connect AC Power Adapter output to the Power Connector.
AC Power Adapter.
Connect AC Power Adapter to the Safety Analyzer plug.
Connect the Safety Analyzer to line power for all tests (Dale 600 for 120 vac; Dale 600E for 240 vac).

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PIP – Power Adapter Instructions

PIP – AC Power Adapter Earth Leakage Current Procedure

Note: AC Power Adapter Earth Leakage Current test results are summarized in the **Leakage Current Specifications Summary Table**.

To test AC Power Adapter Earth Leakage Current:

1. Establish the **PIP – AC Power Adapter Earth Leakage Current Setup** shown in the figure on the previous page.
2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Earth	Any

3. Verify that the AC Power Adapter (UUT) is on. Verify measured current is less than 2500 µA. Record the results in the **PIP Checklist**. Set the safety analyzer controls to:

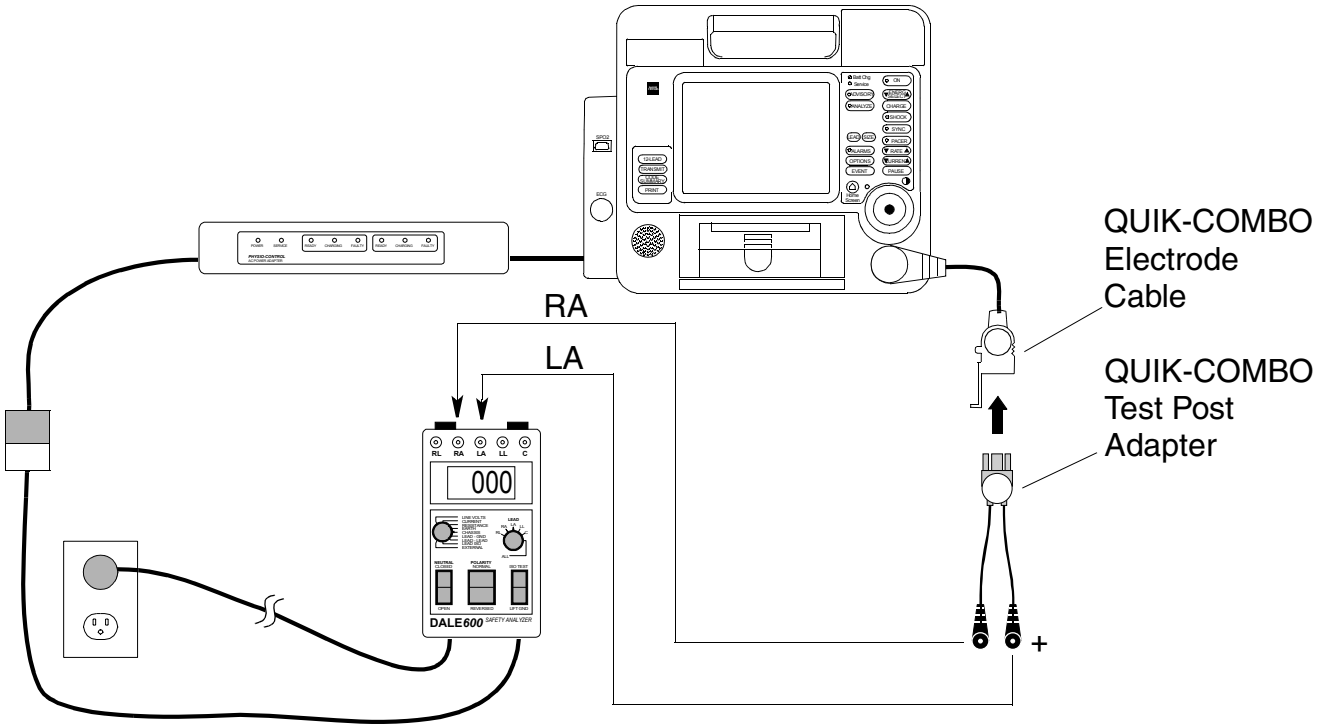
Neutral	Polarity	Mode		Lead
Open	Normal	Leakage µA	Earth	Any

4. Verify that the measured current is less than 5000 µA. Record the results in the **PIP Checklist**.
5. Continue directly to the next leakage current test.

PIP – Power Adapter Instructions

PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Setup

To test AC Power Adapter QUIK-COMBO source leakage current, set up the safety analyzer, AC Power Adapter (UUT), and LIFEPAK 12 defibrillator/monitor as shown below. Continue to the **PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Procedure** when you complete the setup.



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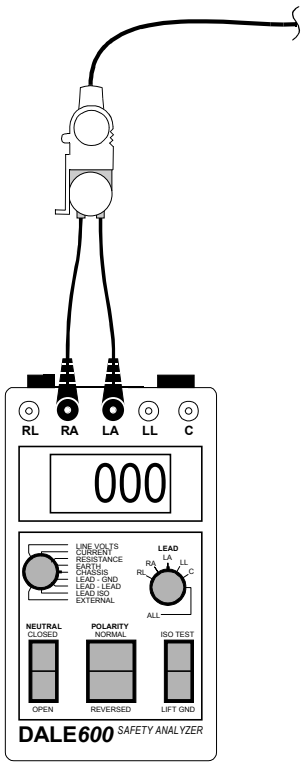
PIP – Power Adapter Instructions

PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Procedure



Note: AC Power Adapter QUIK-COMBO Source Leakage Current test results are summarized in the **Leakage Current Specifications Summary Table**.

To test AC Power Adapter QUIK-COMBO Source Leakage Current:

1. Establish the **PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter (UUT) is on.
3. Turn on the LIFEPAK 12 defibrillator/monitor.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode	Lead
Closed	Normal	Leakage µA Lead – Gnd	All

5. Verify that the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify that the measured current is less than 50 µA.
8. Release the LIFT GND button.

PIP – Power Adapter Instructions

PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Procedure (continued)

9. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Gnd	RA

10. Repeat steps 5 through 8 for the RA Lead.
11. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Gnd	LA

12. Repeat steps 5 through 8 for the LA Lead.
13. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	LA

14. Repeat steps 5 through 8 for Lead – Lead leakage.
15. Record all results on the **PIP Checklist**.
16. Turn off the LIFEPAK 12 defibrillator/monitor.
17. Turn off the AC Power Adapter (UUT).

PIP – Voice Recorder Accessory

PIP Voice Recorder Accessory Inspection Preparation

1. Inspect the voice recorder exterior for damage and loose connections.
2. Verify that the device is firmly attached to the LIFEPAK 12 defibrillator/monitor.

To perform the performance inspection, the following equipment is required:

Equipment	Specifications
LIFEPAK 12 defibrillator/monitor with voice recorder	Software version 3011371-072 or later configured for voice recorder
Running host PC equipped with USB port and	Voice Recorder software Windows Media Player Windows 98 **Second edition**
USB cable	6’ A-plug/B-plug

PIP – Voice Recorder Accessory

PIP Voice Recorder Accessory Capture Audio Recording

CAUTION!

Possible data loss. Verify with the customer that they have downloaded any files existing in the voice recorder memory into their database before performing this test. Performing this test may result in the loss of one or more audio files pre-existing on the recorder.

1. Ensure that the voice recorder is not connected to the host PC.
2. Turn on the LIFEPAK 12 defibrillator/monitor and note the time displayed.
3. Wait approximately 5 seconds and then speak the following message: “This is a performance test of the voice recorder accessory at (customer site). This test is being performed to verify that the voice recorder is capable of acquiring and storing audio data.”
4. Wait approximately 3 seconds and then turn off the LIFEPAK 12 defibrillator/monitor.

PIP – Voice Recorder Accessory

PIP Downloading and Verifying the Audio Recording

Note: Do not plug the USB cable into both the voice recorder and the host PC until step 6.

1. Start up the PC and wait for the voice recorder icon to appear before proceeding.
2. Double-click the icon to bring up the Voice Recorder Import Manager, if the window is not already open.
3. Click in the small text box in the upper right of the Import Manager window. Press and hold CTRL+ALT+SHIFT and then sequentially press the M, P, and C keys. Verify that the Voice Recorder Configuration window appears.
4. Click the Advanced tab and clear the Automatically Get Audio Sessions box by clicking the box.
5. Click the Directory tab.
6. Plug the USB cable into the voice recorder and the host PC. Verify that the Voice Record icon (insert icon) turns green. Wait about 5 seconds.

PIP – Voice Recorder Accessory

PIP Downloading and Verifying the Audio Recording (continued)

7. Click the GET DEVICE DIR: button in the Voice Recorder Configuration window.
8. The window may display from one to many files. Verify that the last file name displayed includes a date and time stamp that is close to the date and time you noted during recording. For example, a file started on November 28 2000, at 10:30.27 in the morning should have a file name similar to: 2000112810302700xxxx where “xxxx” corresponds to the LIFEPAK 12 defibrillator/monitor’s serial number.
9. Clear the boxes next to any additional files that are displayed by clicking the box.

Note: Make sure that the PIP audio file is checked. Uncheck any additional files.

10. Press the START SESSION DOWNLOAD button in the Voice Recorder Configuration window. Follow the progress bar at the bottom of this window. Downloading is complete when the progress bar has completely filled its window and disappeared.

PIP – Voice Recorder Accessory

PIP Downloading and Verifying the Audio Recording (continued)

11. Close the Voice Recorder Configuration window by clicking the OK button.
12. Verify that the file just downloaded appears at the top of the Import Manager window. Verify that the extension is .LAO. You may have to resize the Name window to see the extension.
13. Click the file by to select it and then click the PLAY button on the right side of the Import Manager window.
14. Verify that the file replays what you spoke into the recorder during the audio capture section of this test.
15. Remove the file from the Import Manager window by selecting it (if not currently selected) and clicking the TRASH button in the lower left corner of the Import Manager window.
16. Disconnect the voice recorder from the host PC.
17. Record the results on the LP12 defibrillator/monitor **PIP Checklist**.

This completes the voice recorder accessory Performance Inspection Procedure.

Instrument Calibration

The Instrument Calibration section contains the Test and Calibration Procedures (TCP). Perform the procedures in this section as necessary after replacement of device components or to correct out-of-specification conditions detected during the PIP. The following procedures may be performed in any order.

Note: Anytime the device is calibrated or opened for repair or component replacement, it must successfully pass all portions of the closed-case **Performance Inspection Procedures (PIP)**.

TCP – Scope and Applicability
TCP – Resource Requirements
TCP – Test Equipment Requirements
TCP – Setup
TCP – Service/Calibration Sub-Menu Access
TCP – Defibrillator Calibration
TCP – Computer-Assisted Energy Calibration
TCP – Delivered Energy Test
TCP – Edmark Defibrillator Output Waveform Test
TCP – Biphasic Defibrillator Output Waveform Test
TCP – Pacing Self Calibration
TCP – Pacing Verification Test
TCP – ECG Calibration
TCP – EtCO2 Calibration
TCP – Printer Calibration

TCP – Scope and Applicability

This TCP applies to the LIFEPAK 12 defibrillator/monitor exclusively. You may perform the procedures outlined in this section in any order.

Note: Prior to its return to active use, the LIFEPAK 12 defibrillator/monitor must successfully pass all portions of the closed-case **Performance Inspection Procedures (PIP)** anytime the device is opened for repair, component replacement, or after calibration.

Refer to **TCP – Resource Requirements** for necessary equipment, test equipment verification, workstation power, and qualifications of the TCP personnel.

Refer to **TCP – Test Equipment Requirements** for a listing of test equipment, including specifications, required to complete the TCP.

TCP – Resource Requirements

This section describes the requirements for TCP equipment, TCP test equipment verification, TCP workstation power, and TCP personnel.

TCP – Equipment

To perform the TCP, you must use the equipment listed in the **TCP – Test Equipment Requirements** table. Although the table lists specific test equipment by manufacturer, test equipment with equivalent specifications may be substituted.

TCP – Test Equipment Verification

All test equipment used to perform the TCP must have a current calibration label. The calibration label must be issued by a certified calibration facility.

TCP – Workstation Power

The AC line power to the workstation used must be connected to a grounded power source. The workstation must have Electrostatic Discharge (ESD) protection.

TCP – Personnel

Technicians who perform the PIP must be properly qualified and thoroughly familiar with the operation of the LIFEPAK 12 defibrillator/monitor, meeting the requirements described in **Service Personnel Qualifications**.

TCP – Test Equipment Requirements

You need the following test equipment, or equivalent, to conduct the TCP.

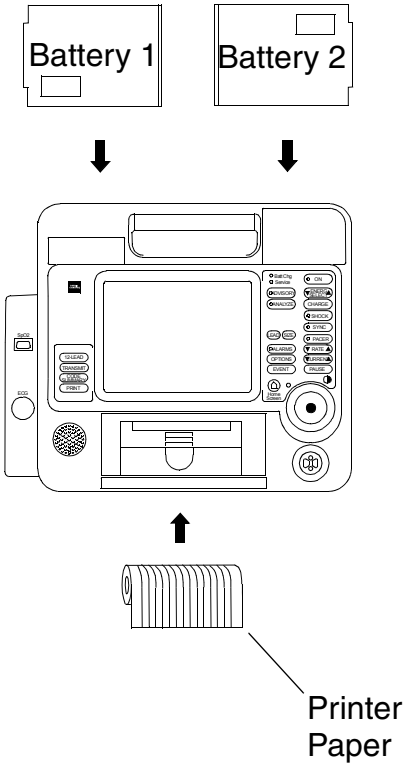
Equipment	Specifications	Manufacturer
Defibrillator Analyzer[1]	Energy range: 0 to 450 J Load resistance: 50 Ω ±1% Accuracy: ±2% +2 J Waveforms: NSR, VF, and Sine Wave	BIO-TEK® QED-6™, with test posts accessory (software version 2.07, or greater)
QUIK-COMBO test post adapter	Connects to QUIK-COMBO Therapy Cable	Medtronic Physio-Control PN 3005302
AC Power Adapter	Input power: 120/230 vac, 50/60 Hz	Medtronic Physio-Control PN 3010942
FASTPAK Battery	NiCd battery	Medtronic Physio-Control PN 09-10424
FASTPAK 2 Battery	NiCd battery with fuel gauge	Medtronic Physio-Control PN 3009375
ECG Calibration Cable		Medtronic Physio-Control PN 3012087-000

1. Some energy meters are not accurate for biphasic waveforms; contact your defibrillator analyzer's manufacturer for more information.

TCP – Test Equipment Requirements

Equipment	Specifications	Manufacturer
General purpose oscilloscope	Bandwidth: dc to 2 MHz Vertical accuracy: ±3% (5 mV – 5 v/div.) Horizontal Time Base Accuracy: ±5%	Tektronix® 2232 or equivalent
CO2 Calibration Kit		Medtronic Physio-Control PN 3012430-01
Calibration Gas	5% CO2, bal. N2	Medtronic Physio-Control PN 3012556
CO2 FilterLine		Medtronic Physio-Control PN XS-04666
QUIK-COMBO Electrode Cable		Medtronic Physio-Control PN 3006570
Standard Paddles		Medtronic Physio-Control PN 3006228
Serial Data Cable		Medtronic Physio-Control PN 3009817

TCP – Setup



The following describes the LIFEPAK 12 defibrillator/monitor setup for the TCP.

WARNING!

Shock hazard. When discharged during this TCP, the device discharges up to 360 J of electrical energy through the defibrillator cable. You must safely discharge this electrical energy as described in this TCP. Do not attempt to perform this procedure unless you are thoroughly familiar with the operation of the device.

To setup the LIFEPAK 12 defibrillator/monitor for the TCP:

1. Insert two fully functional batteries into the UUT. A functional battery is one that does not return a LOW BATTERY message after turning on the device.
2. Verify that each battery clicked into position in the rear panel battery wells.
3. Install a roll of paper into the printer. Use 50 mm or 100 mm paper, whichever is appropriate for your UUT.

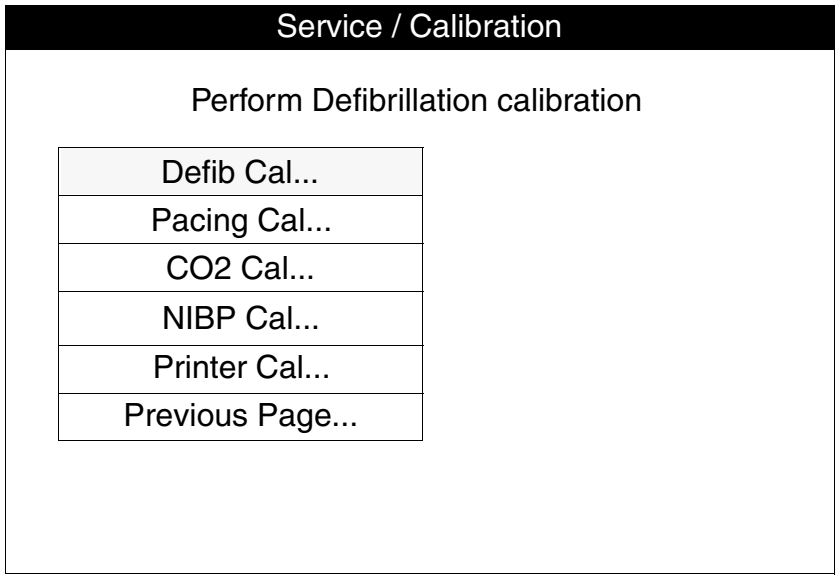
   Note: If the A12 Printer was replaced, save the piece of paper inside the printer that has the printhead resistance written down.

   Note: Do not connect anything to the therapy connector, except as directed during this procedure.

TCP – Service/Calibration Sub-Menu Access

To enter the SERVICE/CALIBRATION menu:

1. Conduct the procedure **TCP – Setup**.
2. Place the unit under test (UUT) in **Service Mode**.
3. Select CALIBRATION from the on-screen SERVICE menu to display the SERVICE/CALIBRATION sub-menu.



TCP – Defibrillator Calibration

Procedure for Edmark UUT with -022 or Earlier Software

Use this procedure with revision -022 software or earlier software for simple defibrillator calibration only. For an Edmark UUT with -030 or later software, go to **Edmark -030 or later Calibration** procedure instead; for a biphasic UUT, go to **Biphasic Calibration** procedure instead. If you have removed or replaced the: high voltage wiring, A01 System PCB, A13 Transfer Relay Assembly, or A14 Waveshaping Inductor, and you have revision -022 software or earlier, use the **Computer-Assisted Energy Calibration** procedure.

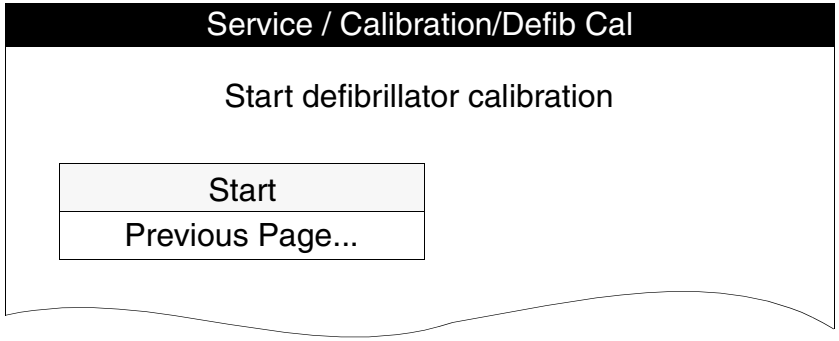
To perform the defibrillator calibration procedure:

1. Disconnect all front panel cables from the UUT.
2. Access the **Service/Calibration Sub-Menu**.
3. Choose DEFIB CAL from the SERVICE/CALIBRATION sub-menu.

TCP – Defibrillator Calibration

Performing the Defibrillator Calibration (continued)

4. Select START to initiate the calibration routine from the SERVICE/CALIBRATION/DEFIB CAL overlay.



5. After about 15 seconds, the message CALIBRATION COMPLETE is displayed.
6. Turn off the UUT.
7. Continue directly to **TCP – Delivered Energy Test**.

TCP – Defibrillator Calibration

Procedure for Edmark UUT with -030 or Later Software

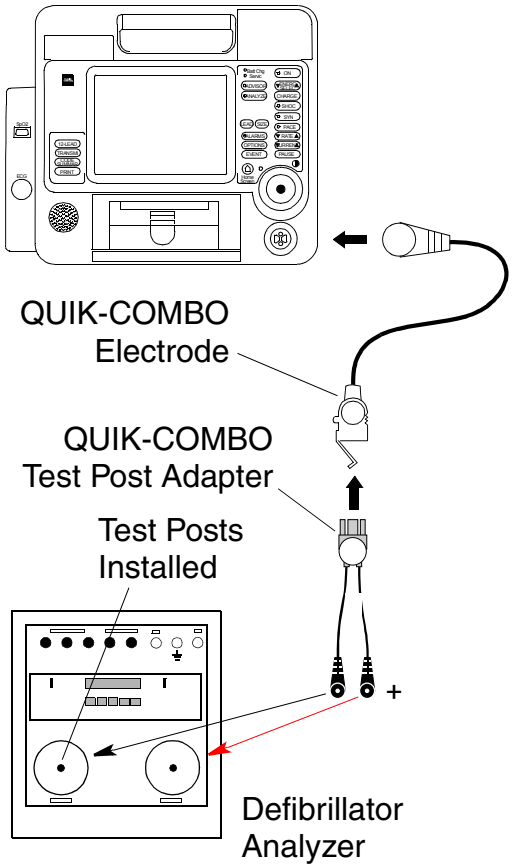
Use this procedure for an Edmark UUT with revision -030 or later software. For an Edmark UUT with -022 or earlier software, go to the procedure for **Edmark UUT with -022 or Earlier Software** instead; for a biphasic UUT, go to the **Biphasic Calibration** procedure instead.

Performing the Defibrillator Calibration

To perform the defibrillator calibration procedure:

1. Disconnect all front panel cables from the UUT.
2. Access the **Service/Calibration Sub-Menu**.
3. Choose DEFIB CAL from the SERVICE/CALIBRATION sub-menu.
4. Choose AUTO CAL from the SERVICE/CALIBRATION/DEFIB CAL sub-menu.

TCP – Defibrillator Calibration



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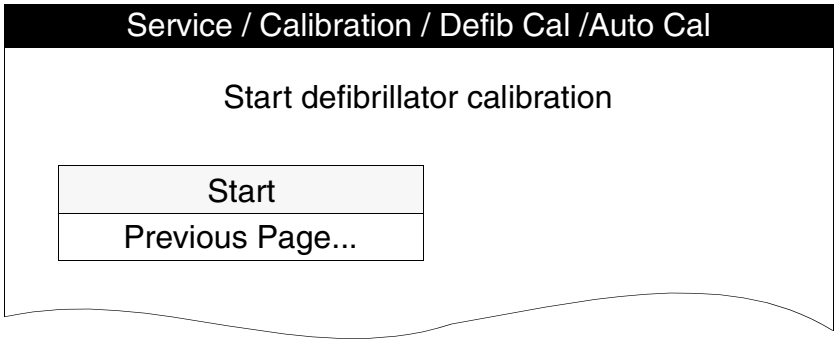
5. Select START to initiate the calibration routine from the SERVICE/CALIBRATION/DEFIB CAL/AUTO CAL overlay.



6. After about 15 seconds, the message CALIBRATION COMPLETE is displayed.
7. Select PREVIOUS PAGE.
8. Connect the UUT to the defibrillator analyzer. Make sure the QUIK-COMBO (+) terminal is connected to apex (+).

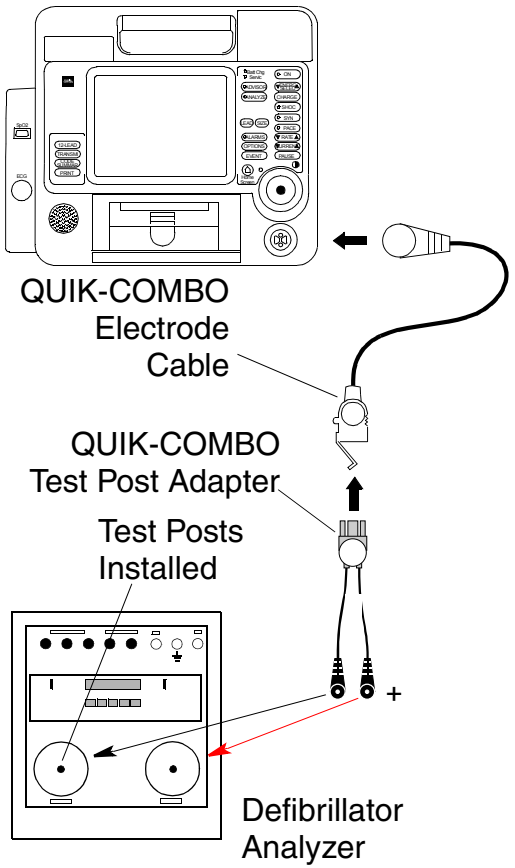
   Note: Adapt this procedure to use standard paddles, if desired.
9. Set the defibrillator analyzer to measure energy, with the appropriate scale.
10. On the UUT, select MANUAL CAL from the SERVICE/CALIBRATION/DEFIB CAL sub-menu.

TCP – Defibrillator Calibration

11. Select START to initiate the manual calibration routine.
12. Follow the instructions on the UUT screen.
13. Turn off the UUT.
14. Continue directly to **TCP – Delivered Energy Test**.

TCP – Defibrillator Calibration

Procedure for Biphasic UUT



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Use this procedure for a biphasic UUT. For an Edmark UUT with -022 or earlier software, go to the **Procedure for UUT with Edmark -022 or Earlier Software** instead; for an Edmark UUT with -030 or later software, go to the **Procedure for UUT with Edmark -030 or later Calibration** procedure instead.

Note: Biphasic UUT does not include an Auto-Cal feature.

To perform the defibrillator calibration procedure:

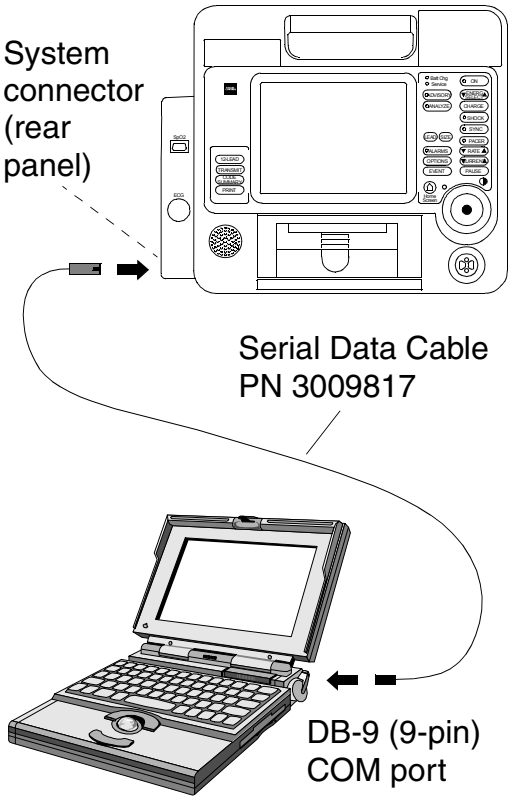
1. Connect the UUT to the defibrillator analyzer. Make sure the QUIK-COMBO (+) terminal is connected to apex (+).

   Note: Adapt this procedure to use standard paddles, if desired.

2. Set the defibrillator analyzer to measure energy, with the appropriate scale.
3. Access the **Service/Calibration Sub-Menu**.
4. Choose DEFIB CAL from the SERVICE/CALIBRATION sub-menu.
5. Select START to initiate the calibration routine.
6. Follow the instructions on the UUT screen.
7. Turn off the UUT.
8. Continue directly to **TCP – Delivered Energy Test**.

TCP – Computer-Assisted Energy Calibration

When To Use This Procedure



Use this procedure for device energy calibration of Edmark UUT with -022 or earlier software if you removed or replaced the: high voltage wiring, A01 System PCB, A13 Transfer Relay Assembly, or A14 Waveshaping Inductor. Otherwise, use the **Defibrillator Calibration** procedure instead.

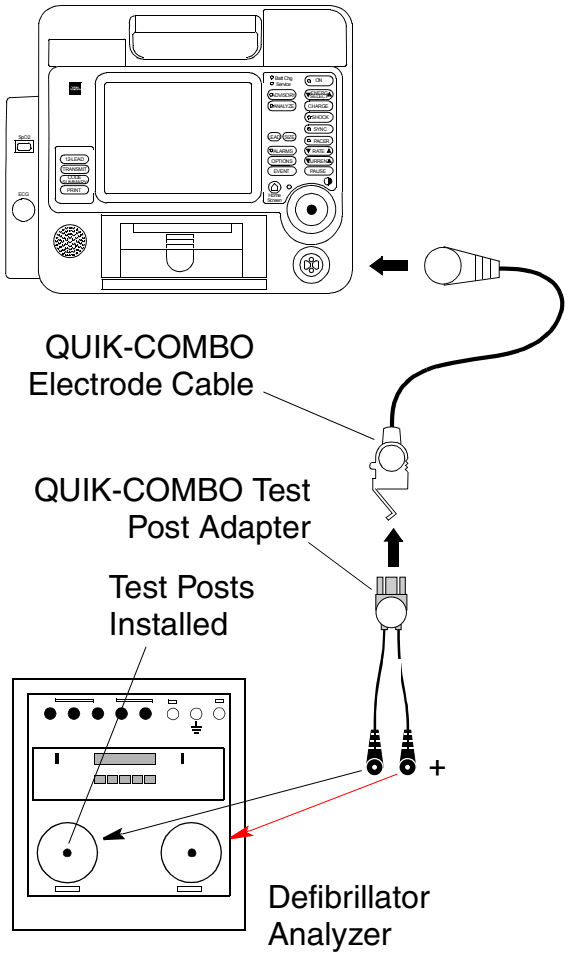
Use of the computer-assisted energy calibration procedure is also indicated in cases where **Defibrillator Calibration** alone does not bring the delivered energy into specification.

The computer-assisted energy calibration procedure combines manual operations with computer-assisted test routines. Follow the instructions in this Service Manual along with instructions given in the computer-assisted energy calibration program.

WARNING!

Shock hazard. When discharged during this TCP, the device discharges up to 360 J of electrical energy through the defibrillator cable. You must safely discharge this electrical energy as described in this TCP. Do not attempt to perform this procedure unless you are thoroughly familiar with the operation of the device.

TCP – Computer-Assisted Energy Calibration



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To perform the computer-assisted energy calibration procedure:

1. Install the Defibrillator Calibration program from the Service Manual CD-ROM onto your Personal Computer (PC) hard drive. Instructions are provided with the CD-ROM. Or, if already installed, continue to step 2.

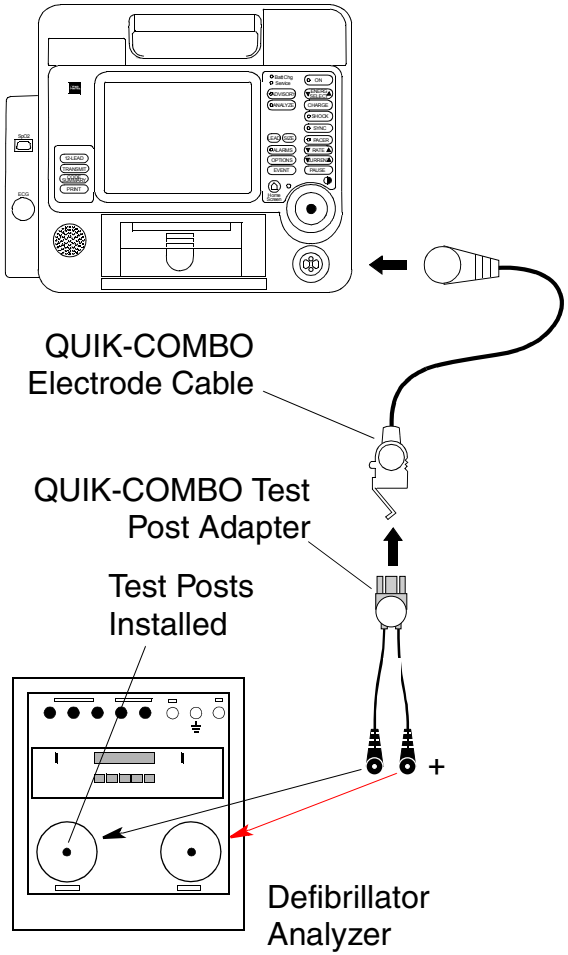
2. Click **Run the Computer-Assisted Test Program** to launch the program LP12CAL.EXE on your PC.

3. Click the DEFIBRILLATOR ENERGY CALIBRATION START button. Follow each step as presented in the LP12CAL.EXE program. You will be prompted on your PC screen to turn the device on and off, to connect and disconnect the therapy cable, to connect the therapy cable output to a defibrillation analyzer (as shown on left), and related activities.

4. At the completion of the calibration, disconnect the PC and remove the serial cable from the device, but leave the setup for the defibrillator analyzer.

5. Continue directly to **TCP – Delivered Energy Test**.

TCP – Delivered Energy Test



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WARNING!

Shock hazard. Avoid contact with the energy meter. Dangerous voltages will be present on energy meter electrode plates/posts.

To verify the defibrillator delivered energy:

1. Connect the UUT to the defibrillator analyzer. Make sure the QUIK-COMBO (+) terminal is connected to apex (+).

   Note: Adapt this procedure to use Standard Paddles, if desired.

2. Set the defibrillator analyzer to measure energy, with the appropriate scale.
3. Turn on the UUT. Verify that the ADVISORY indicator is off. If not, see **Entering Manual Mode**.
4. Press the ENERGY SELECT control to select 2 J.
5. Press the CHARGE control and wait for the UUT to reach full charge. Press the SHOCK control to discharge the UUT energy.
6. Verify that the defibrillator analyzer shows an energy level between 1.0 and 3.0 J.

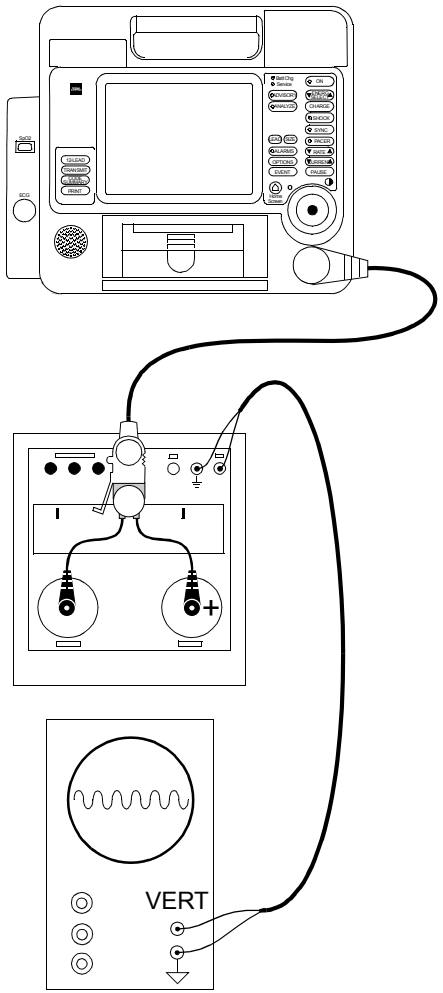
Note: All energy levels listed in the **Delivered Energy Test table** are not available on every UUT.

TCP – Delivered Energy Test

7. Repeat steps 4 through 6 for the remaining available energy levels specified in the Delivered Energy Test table.

Energy Level (J)	Acceptable Output (J)	Energy Level (J)	Acceptable Output (J)
2	1.0 to 3.0	70	66.5 to 73.5
3	2.0 to 4.0	100	97.5 to 102.5
4	3.0 to 5.0	125	123.0 to 128.0
5	4.0 to 6.0	150	146.3 to 158.8
6	5.0 to 7.0	175	170.62 to 179.38
7	6.0 to 8.0	200	195.0 to 205.0
8	7.0 to 9.0	225	219.37 to 230.63
9	8.0 to 10.0	250	243.75 to 256.25
10	9.0 to 11.0	275	268.12 to 281.88
15	14.0 to 16.0	300	292.5 to 307.5
20	19.0 to 21.0	325	316.87 to 333.13
30	28.5 to 31.5	360	351.0 to 369.0
50	47.5 to 52.5		

TCP – Edmark Defibrillator Output Waveform Test



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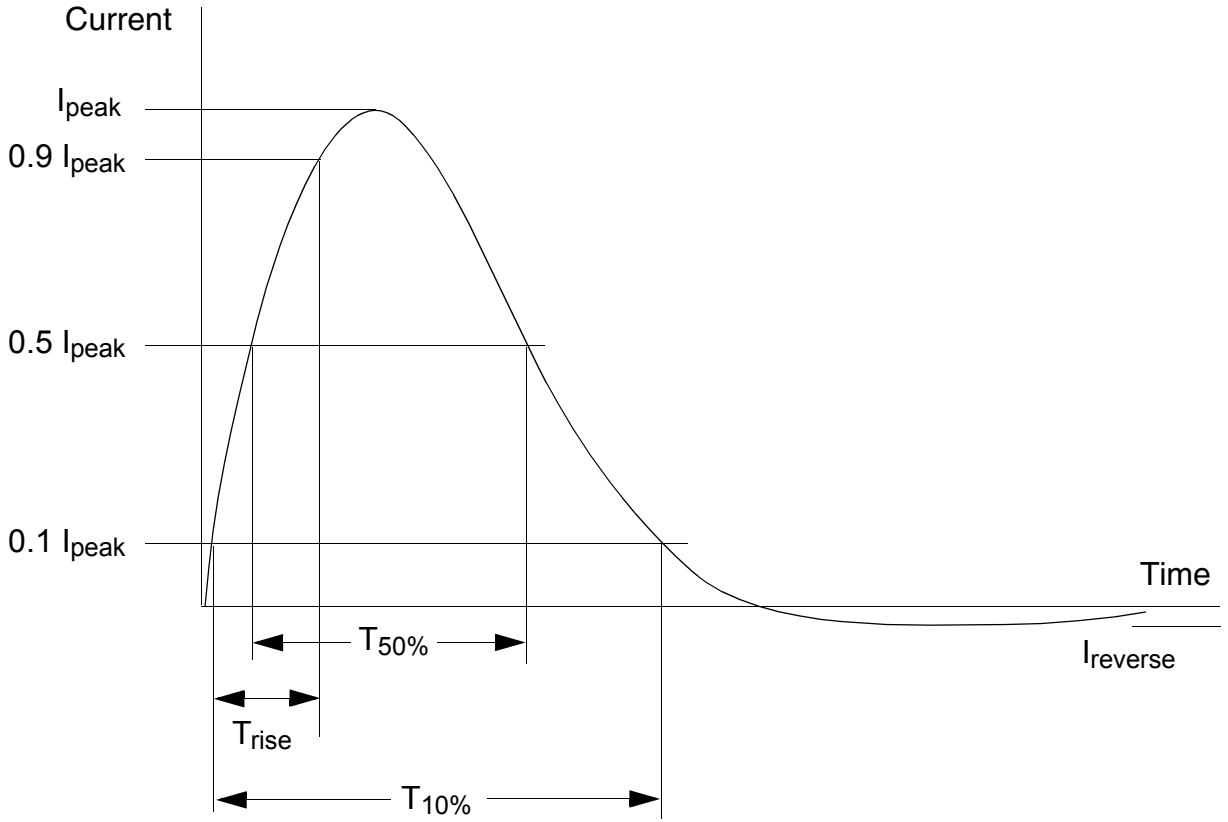
The Defibrillator Output Waveform Test is optional and is intended to aid in troubleshooting for failure symptoms in the A13 Transfer Relay Assembly, A14 Waveshaping Inductor, or the A15 Energy Storage Capacitor. Use fully charged batteries when you perform this procedure.

1. Connect the UUT to a defibrillator analyzer using the QUIK-COMBO electrode cable and test post adapter. Set the defibrillator analyzer to ENERGY, 1000 J scale.
2. Connect the DEFIB and GND terminals on the defibrillator analyzer to an oscilloscope vertical channel input and ground input. Set the oscilloscope to 0.5 V/div, 1 ms/div, + slope, store mode, and single sweep.

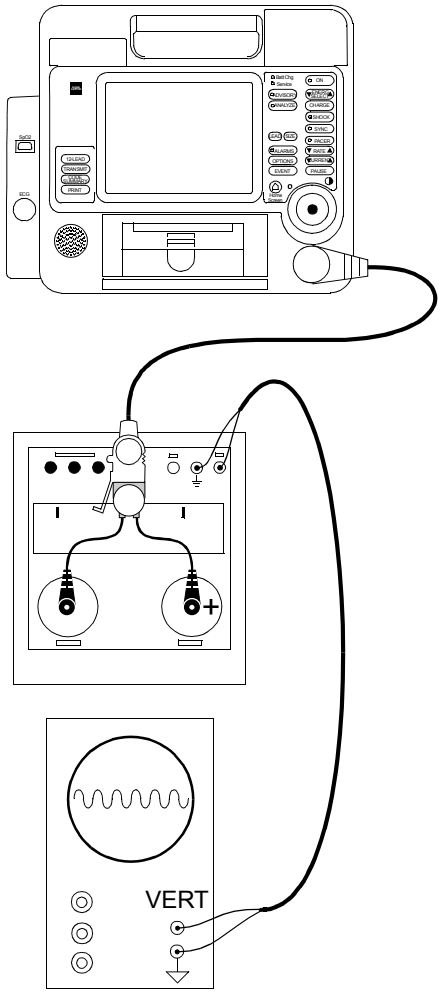
   Note: 1 V on the oscilloscope = 29 A defibrillator output current when using the QED-6 Defibrillator Analyzer. When using other energy meters or analyzers, refer to the manufacturer's specifications.
3. Turn on the UUT. Press the ENERGY SELECT control and select 360 J.
4. Press the CHARGE control. After the capacitor charges (the SHOCK indicator is blinking), press the SHOCK control to deliver the energy to the analyzer.
5. Verify that the waveform meets specifications (see next page for Edmark UUT).
6. When testing is complete, turn off the UUT and disconnect the test setup.

TCP – Edmark Defibrillator Output Waveform Test

Parameter	Range
I_{peak}	46 - 64 A
$I_{reverse}$	0 - 18 A
T_{rise}	0.4 ms - 1.42 ms
$T_{50\%}$	2.10 ms - 4.18 ms
$T_{10\%}$	3.10 ms - 9.20 ms
Nominal 50-ohm load	



TCP – Biphasic Defibrillator Output Waveform Test



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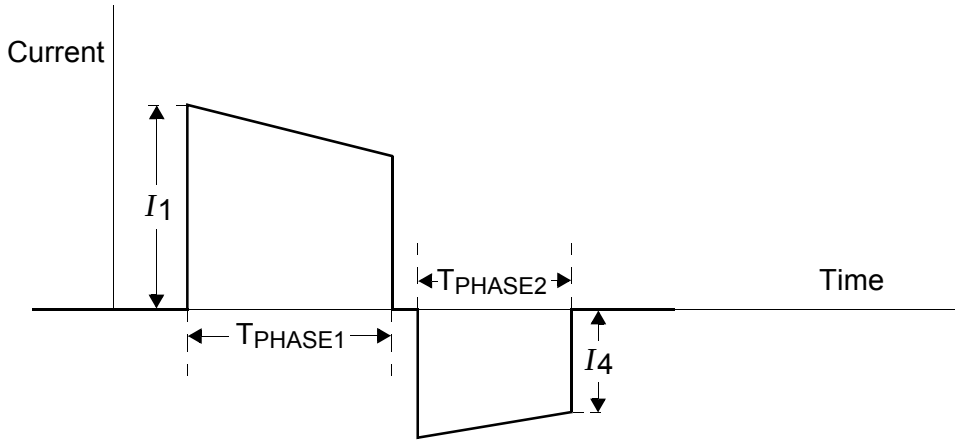
The Defibrillator Output Waveform Test is optional and is intended to aid in troubleshooting the A13 Transfer Relay Assembly or the A15 Energy Storage Capacitor. Use fully charged batteries when you perform this procedure.

1. Connect the UUT to a defibrillator analyzer using the QUIK-COMBO electrode cable. Set the defibrillator analyzer to ENERGY, 1000 J scale.
2. Connect the DEFIB and GND terminals on the defibrillator analyzer to an oscilloscope vertical channel input and ground input. Set the oscilloscope to 0.5 V/div, 2 ms/div, + slope, store mode, and single sweep.

   Note: 1 V on the oscilloscope = 29 A defibrillator output current using the QED-6 energy meter. When using other energy meters, refer to the manufacturer's specifications. You may need to slow down the horizontal sweep and/or turn on the triggering high-frequency reject to successfully capture the waveform.
3. Turn on the UUT. Press the ENERGY SELECT control and select 360 J.
4. Press the CHARGE control. After the capacitor charges (the SHOCK indicator is blinking), press the SHOCK control to deliver the energy to the analyzer.
5. Verify that the waveform meets specifications (see next page for biphasic UUT).
6. When testing is complete, turn off the UUT and disconnect the test setup.

TCP – Biphasic Defibrillator Output Waveform Test



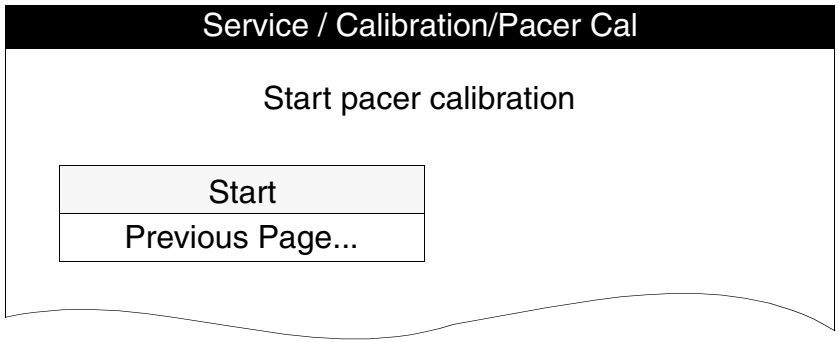
Patient Impedance (Ω)	T_{PHASE1} (ms)		T_{PHASE2} (ms)		Tilt	
	Min	Max	Min	Max	Min	Max
50	6.8	7.9	4.5	5.3	63.9	71.0

Note 1. Delivered waveform at 360 joules into given resistive load.
Note 2. Discharge polarity is APEX positive, STERNUM negative for Phase 1.
Note 3. Tilt $= \frac{(I_1 - |I_4|)}{I_1}$

TCP – Pacing Self Calibration

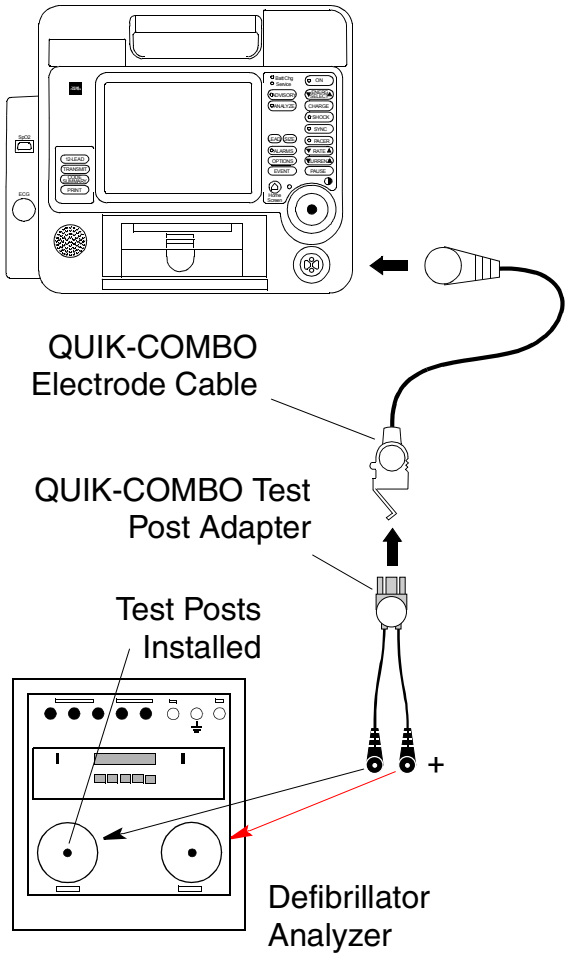
To perform the pacer self calibration procedure:

1. Disconnect all front panel cables from the UUT.
2. Access the **Service/Calibration Sub-Menu**.
3. Choose PACING CAL from the SERVICE/CALIBRATION sub-menu.
4. Select START to initiate the calibration routine from the SERVICE/CALIBRATION/PACER CAL overlay.



5. After about 60 seconds, the message CALIBRATION COMPLETE is displayed.
6. Turn off the UUT.
7. Continue directly to **TCP – Pacing Verification Test**.

TCP – Pacing Verification Test



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WARNING!

Shock hazard. Avoid contact with the energy meter. Potentially dangerous voltages will be present on energy meter electrode plates/posts.

To verify the pacer current levels (for UUTs equipped with pacing):

1. Connect the UUT to the defibrillator analyzer. Make sure the QUIK-COMBO (+) terminal is connected to apex (+).
2. Set the defibrillator analyzer for pacing measurements.
3. Turn on the UUT. Verify the ADVISORY indicator is off. If not, see **Entering Manual Mode**.
4. Press the PACER control to activate pacing.
5. Press the CURRENT control, then use the Selector to select a current of 10 mA. Verify the measured pacer current is between 5 and 15 mA.
6. Repeat step 5 for the remaining pacer current levels specified in the **Pacer Current Test table** (next page).

   Note: Press the CURRENT control, as required, to maintain the CURRENT overlay on the screen.

TCP – Pacing Verification Test

Set Current (mA)	Output (mA)	Set Current (mA)	Output (mA)	Set Current (mA)	Output (mA)
10	5 to 15	75	70 to 80	140	133.0 to 147.0
15	10 to 20	80	75 to 85	145	137.7 to 152.3
20	15 to 25	85	80 to 90	150	142.5 to 157.5
25	20 to 30	90	85 to 95	155	147.2 to 162.8
30	25 to 35	95	90 to 100	160	152.0 to 168.0
35	30 to 40	100	95 to 105	165	156.7 to 173.3
40	35 to 45	105	99.7 to 110.3	170	161.5 to 178.5
45	40 to 50	110	104.5 to 115.5	175	166.2 to 183.8
50	45 to 55	115	109.2 to 120.8	180	171.0 to 189.0
55	50 to 60	120	114.0 to 126.0	185	175.7 to 194.3
60	55 to 65	125	118.7 to 131.3	190	180.5 to 199.5
65	60 to 70	130	123.5 to 136.5	195	185.2 to 204.8
70	65 to 75	135	128.2 to 141.8	200	190.0 to 210.0

TCP – ECG Calibration

Applicability

This procedure applies only to LIFEPAK 12 defibrillator/monitors with operating system software PN 3011371-022 or above installed. Do not perform ECG calibration on devices equipped with any previous operating system version. If in doubt regarding the software version of your defibrillator/monitor, press the ON button to turn device power off, then press the ON button again, and note the software version displayed on the copyright screen.

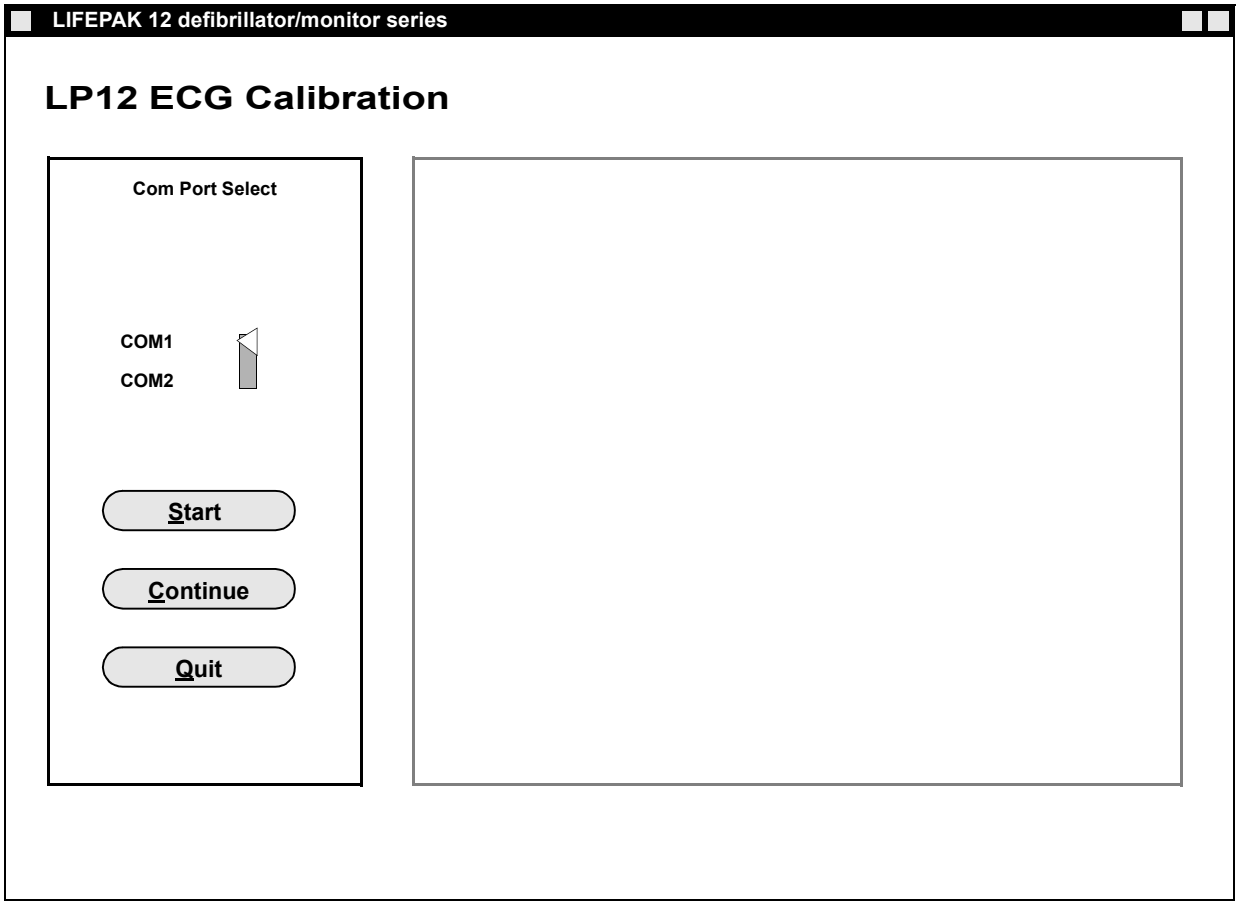
Installing the ECG Calibration Software

1. Open the folder on the LIFEPAK 12 defibrillator/monitor Service Manual CD entitled LP12ECG CAL.
2. To install the ECG calibration utility on your personal computer, double click the file SETUP.EXE.

ECG Calibration Procedure

1. Open the LP12EGCCAL application. The application layout shown on the next page appears on your computer display.
2. Click the START button, and follow the instructions on the screen to perform ECG calibration.

TCP – ECG Calibration

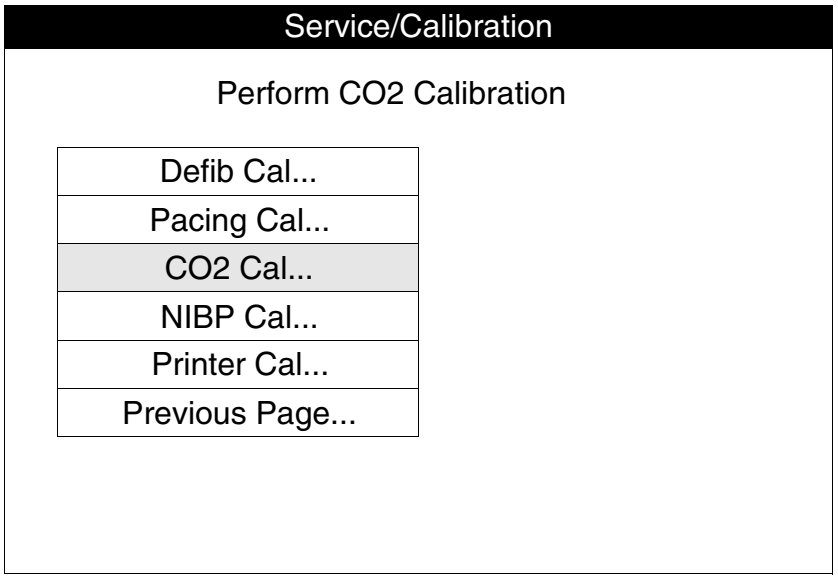


TCP – EtCO2 Calibration

To calibrate the ETCO2 module:

Note: Allow 20 minutes from initial power on for the UUT to warm up before proceeding with the calibration of the EtCO2 module:

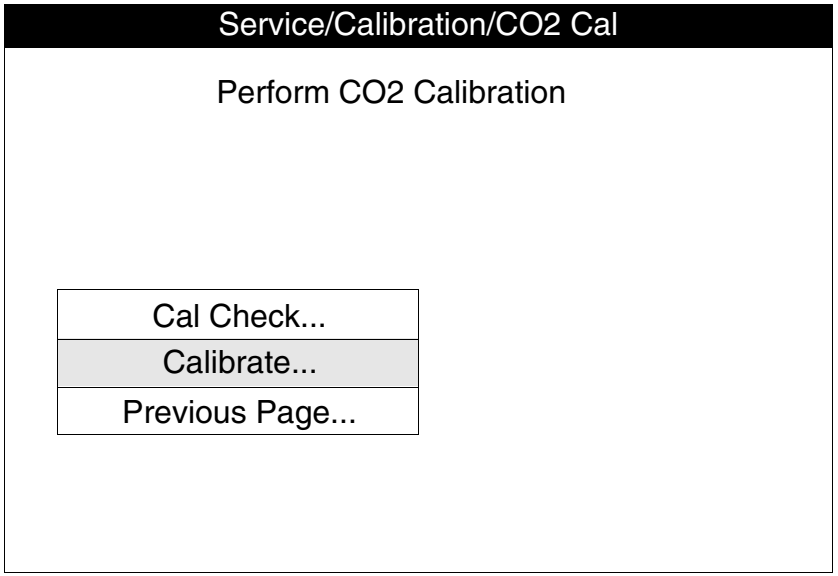
1. Access the SERVICE/CALIBRATION sub-menu by selecting CALIBRATION from the SERVICE menu.
2. Select CO2 CAL . . . .



TCP – EtCO2 Calibration

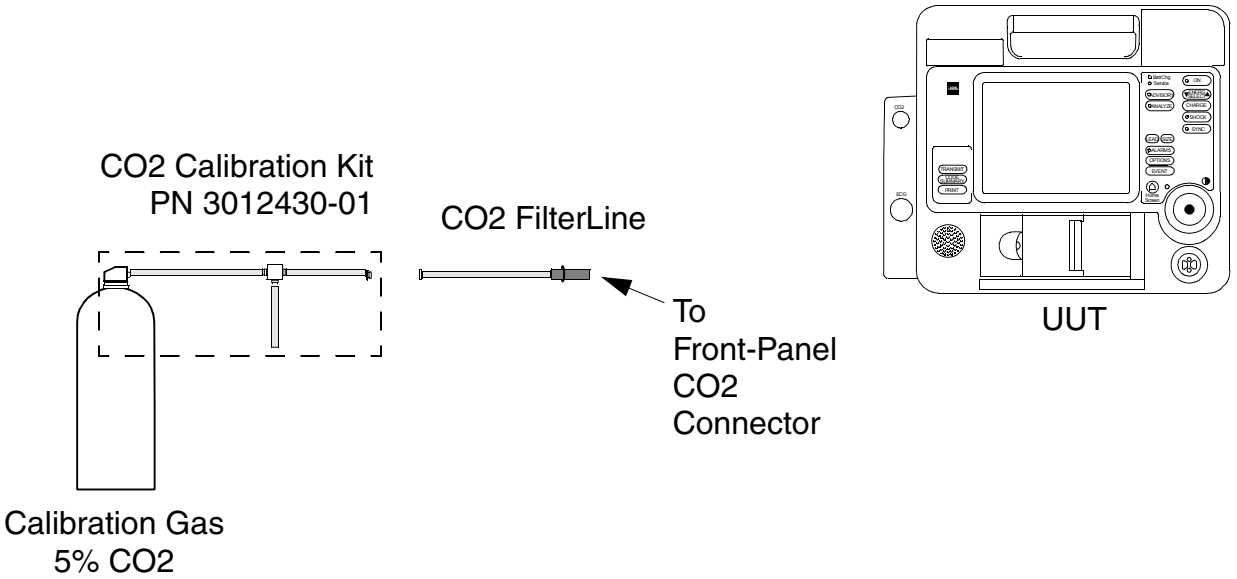
To initiate CO2 calibration:

Select CALIBRATE . . . from the SERVICE/CALIBRATION/CO2 CAL sub-menu.



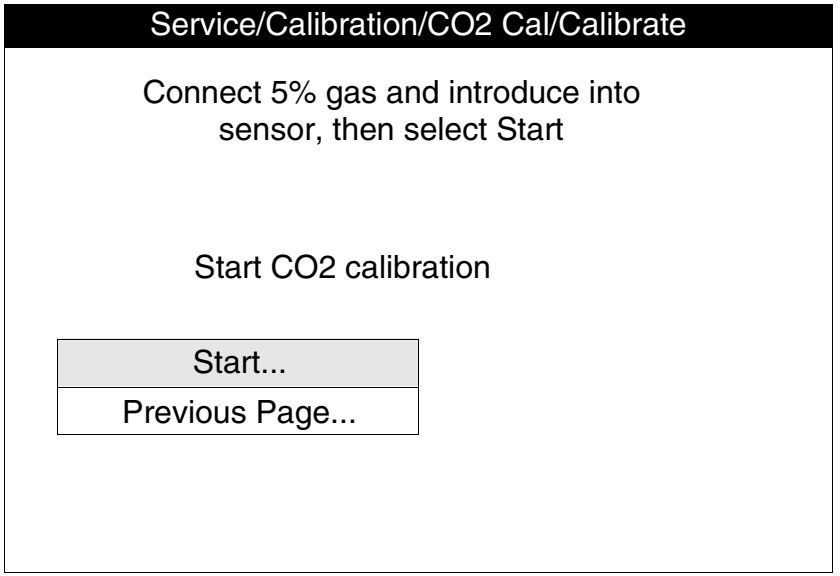
TCP – EtCO2 Calibration

Connect the calibration gas canister to the front panel CO2 connector using a standard CO2 FilterLine and the CO2 calibration kit.



TCP – EtCO2 Calibration

1. Press and hold the spray nozzle to apply calibration gas.
2. Select START.... Verify that the display reads CALIBRATION IN PROGRESS . . . .

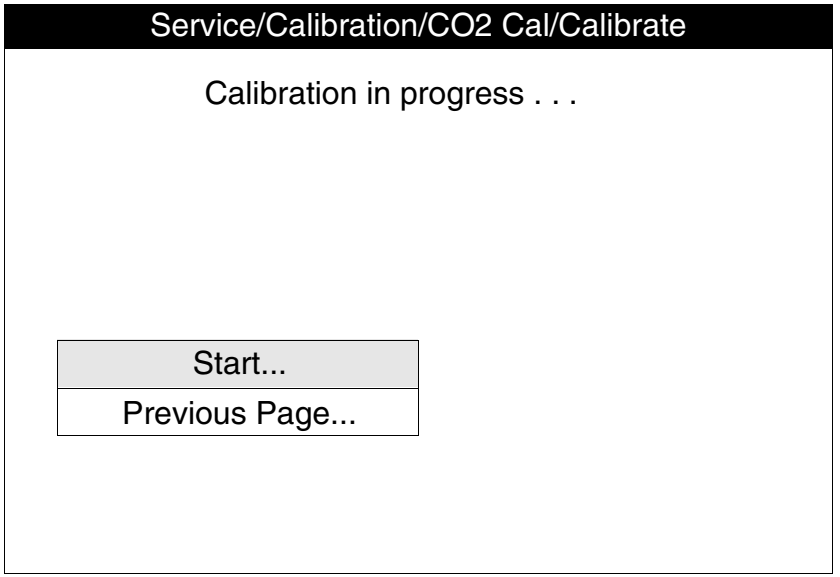


TCP – EtCO2 Calibration

1. Hold the spray nozzle down. When the DISCONNECT GAS prompt appears, release the spray nozzle.

   Note: Do not disconnect the filter line until the CALIBRATION OK message appears.

2. Verify that the message CALIBRATION OK appears. If CALIBRATION FAILED is displayed, the LIFEPAK 12 defibrillator/monitor logs a service error code, and the SERVICE indicator illuminates.



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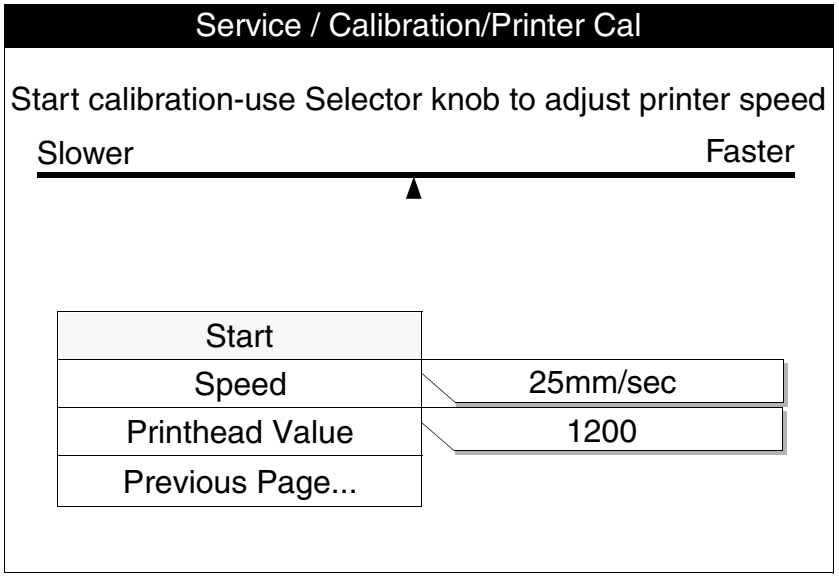
TCP – Printer Calibration

To perform the printer calibration procedure:

1. Disconnect all front panel cables from the UUT.
2. Access the **Service/Calibration Sub-Menu**.
3. Choose PRINTER CAL from the SERVICE/CALIBRATION sub-menu.



TCP – Printer Calibration

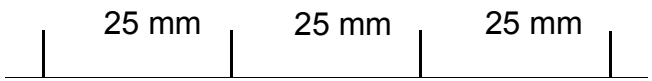
4. If you changed the A12 Printer (50 mm or 100 mm) and are calibrating a new printer, go to step 5. If you are calibrating an existing printer, go to step 6.

5. Select PRINTHEAD VALUE. Rotate the Selector to match the printhead resistance recorded for this printer, then press the Selector.

   Note: If you failed to record the printhead resistance value or cannot find the value, see the **A12 Printer Replacement** procedure to remove the printer, locate the resistance value, and then reinstall the printer.

6. Select START, then push the Selector. The printer runs and prints horizontal tick marks.

7. Notice the spacing of the printed tick marks. The correct interval between marks is 25 mm. Use the Selector to adjust the printer speed SLOWER or FASTER.



8. When the marks are spaced at 25 mm, press the Selector to stop printing.

9. Turn off the UUT.

Troubleshooting

The Troubleshooting section describes Error Code usage, interpretation, and corrective action, a separate Troubleshooting Chart keyed to the Performance Inspection Procedures (PIP), and individual troubleshooting tests that require operator interpretation. Choose from the following topics:

Troubleshooting Chart

Using the Service/Status Features

About the Device Log

About the Error Log

About Counters

About Clear Memory

Processing Error Codes

Error Code Categories

Troubleshooting

Error Code Table
Corrective Action Codes
About the SERVICE Indicator
About the Device User Test
Contrast Test—LCD Only
Pixels Test
PC Card Test
12-Lead/3-Lead ECG Fast Restore Test
Fast Restore Test Fixture

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
Physical Inspection	Loose or broken hardware	Locate and tighten or replace loose items. Locate and replace broken components.
	Evidence of dirt, fluids, or foreign objects	**Perform External Cleaning**.
	Damaged keypad or label	**Replace A09 Small Keypad**. **Replace A10 Large Keypad**. **Replace Bezel Label (158)**. **Replace Product Identification Label (162)**. **Replace Explosion/Hazard Label (164)**. **Replace Operating Instruction Label (170)**.
	Damaged battery pin(s)	**Replace battery pin(s)**.
Power On/Self Test	No power on	Install fully charged, properly maintained batteries. Check or **replace battery pin(s)**. Check or **replace A03 Power PCB**.
	SERVICE indicator remains on	See **Processing Error Codes** for assistance.
	MAINTENANCE DUE indicator remains on	Perform Setting the Maintenance Prompt interval. Perform Resetting the Maintenance Prompt interval.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
LCD (only)	Improper LCD response	Perform **Pixels Test**. Check or **replace A11 LCD Assembly**. Check or **replace A01 System PCB**.
Keypanels	Improper key response	Check or **replace A09 Small Keypad**. Check or **replace A10 Large Keypad**. Check or **replace A05 Interface PCB**. Check or **replace A01 System PCB**.
Printer	Missing dots in printed “X”	Verify use of proper printer paper. Clean the printhead (50 mm or 100 mm printer). Check or **replace A12 Printer Assembly**.
	One or more horizontal lines missing or distorted	Check or **replace A01 System PCB**.
	Missing or broken characters	Verify use of proper paper. Clean the printhead (50 mm or 100 mm printer). Check or **replace A12 Printer Assembly**. Check or **replace A01 System PCB**.
	Improper 25 mm marker spacing	Perform the **Printer Calibration**.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
Printer	CHECK PRINTER screen message appears	Perform **Paper Sensor Cleaning**. Verify that the **printer paper is correctly loaded**. Check or **replace A12 Printer Assembly**.
Audio	Inaudible or garbled audio	Check or **replace the W17 Speaker Assembly**. Check or **replace the A05 Interface PCB**. Check or **replace the A01 System PCB**.
Power Source Management		Verify instructions and retry test. Substitute another battery and retry test. Check or **replace battery pin(s)**. Check or replace test battery. Check or replace the AC Power Adapter. Check or replace **A03 Power PCB**. Check or replace **A03 Power PCB Fuses.**

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
QUIK-COMBO or Standard Paddles Delivered Energy	No energy discharge	Verify test setup and retry test. See **Processing Error Codes** for assistance. Check or replace Therapy Cable or Standard Paddles. Check or **replace W11 Therapy Connector Cable**. Check or **replace A04 Therapy PCB**. Check or **replace A13 Transfer Relay Assembly**. Check or **replace A14 Waveshaping Inductor**. Check or **replace A15 Energy Storage Capacitor**.
	Delivered energy out of tolerance	Perform **Defibrillator Self Calibration**.
QUIK-COMBO Impedance Sense	Inappropriate screen message response	Verify test setup and retry test. Check or replace Therapy Cable. Check or **replace W11 Therapy Connector Cable**. Check or **replace A04 Therapy PCB**.
Standard Paddles Defibrillation Isolation	Measured energy exceeds 18 J	Verify test setup and retry test. Check internal high voltage wire routing; repair as necessary. Check internal high voltage wire connections; repair as necessary.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
QUIK-COMBO or Standard Paddles Synchronous Cardioversion	No Sync mark	Verify test setup and retry test. Adjust ECG size. Check or **replace A01 System PCB**.
	Failure to transfer coincident with Sync mark	Take UUT out of Sync and try to discharge. Perform **Keypad Test**. Check or replace standard paddles.
User Test	Service indicator Illuminates, User Test fails	Cycle device power - repeat User Test. If an AC Power Adapter is in use, wait 2 seconds after disconnecting from line power, turn device on and repeat User Test. Access Error Log, and clear Error codes.
	Sync discharge time exceeds 60 ms	Verify test setup and retry test. Check or **replace A01 System PCB**.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
Pacer Option Characteristics	Inappropriate screen message or alarm response	Verify test setup and retry test. Check or replace Therapy Cable. Check or replace ECG Cable. Check or **replace W11 Therapy Connector Cable**. Check or **replace W07 ECG Connector Cable**. Check or **replace A10 Large Keypad**. Check or **replace A04 Therapy PCB**.
	Peak current levels out of tolerance	Perform **Pacing Self Calibration**.
	Pacer pulse width out of tolerance	Check or **replace A04 Therapy PCB**.
No Pacer Option Characteristic	Inappropriate screen message response	Check or **replace A04 Therapy PCB**.
12-Lead ECG Characteristics	Inappropriate screen message response	Verify test setup and retry test. Check or replace ECG Cable. Check or **replace W07 ECG Connector Cable**. Check or **replace A09 Small Keypad**.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
12-Lead ECG Characteristics	ECG gain out of tolerance	Verify test setup and retry test. Check or replace ECG Cable. Check or **replace A01 System PCB**.
Characteristics 3-Lead ECG	Inappropriate screen message response	Verify test setup and retry test. Check or replace ECG Cable. Check or **replace W07 ECG Connector Cable**. Check or **replace A09 Small Keypad**.
	ECG gain out of tolerance	Verify test setup and retry test. Check or replace ECG Cable. Check or **replace A01 System PCB**. Check or **replace A04 Therapy PCB**.
QUIK-COMBO ECG Characteristics	ECG gain out of tolerance	Verify test setup and retry test. Check or replace Therapy Cable. Check or **replace A04 Therapy PCB**. Check or **replace A01 System PCB**.
	ECG fast restore out of tolerance	Verify test setup and retry test. Check or replace Therapy cable. Check or **replace A01 System PCB**.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
Standard Paddles ECG Characteristics	ECG gain out of tolerance	Verify test setup and retry test. Check or replace standard paddles. Check or **replace A04 Therapy PCB**. Check or **replace A01 System PCB**.
	ECG fast restore out of tolerance	Verify test setup and retry test. Check or replace standard paddles. Check or **replace A04 Therapy PCB**.
ECG Analog Output	Output waveform missing or out of tolerance	Verify test setup and retry test. Check or replace Analog ECG Output Cable. Check or **replace W08 System Connector Cable**. Check or **replace A01 System PCB**.
Oximeter	Saturation reading missing or out of tolerance	Verify test setup and retry test. Retry test with another test subject. Check or replace SpO2 finger probe. Check or **replace W22 SpO2 Connector Cable**. Check or **replace A16 SpO2 Module**. Check or **replace A06 OEM PCB**.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
PC Card	Inappropriate screen message response	Verify test setup and retry test. Try another PC Card. Check or **replace W14 System PCB/PC Card Slot Cable**. Check or **replace A01 System PCB**.
Fax Transmission	Unable to complete fax transmissions	Verify that the 3 com Megahertz 56K Modem card is installed. In the setup\transmission\Fax\Ports\Internal cell fax screen, enter initialization string AT&F6E0V1 under edit string 1.
NIBP Monitor	NIBP monitor displays XXX in the NIBP region of the display with the SERVICE indication OFF	Perform NIBP leakage test. Replace A21 NIBP module.
	NIBP monitor displays XXX in the NIBP region of the display with the SERVICE indication ON	Check tubing between the NIBP connector and NIBP module for kinks or occlusions. Replace A21 NIBP module.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
EtCO2 Monitor	CO2 monitor fails calibration	Verify test setup and retry test. Check to see if CO2 calibration gas canister is empty. Check FilterLine to see if it is disconnected. Replace A23 CO2 module.
	CO2 monitor displays FilterLine Blockage message	Replace FilterLine. Check input tubing between CO2 connector and CO2 module for kinks or occlusions. Replace A23 CO2 module.
	CO2 monitor displays XXX in the CO2 region of the display with SERVICE indicator OFF	Perform EtCO2 calibration. Replace A23 CO2 module.
	CO2 displays XXX in the CO2 region with SERVICE indicator ON	Check that the CO2 exhaust port is not blocked. Check exhaust tubing between CO2 module and CO2 exhaust port for kinks or occlusions. Replace A23 CO2 module.

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
Leakage Current	UUT fails chassis leakage test	Verify instructions, setup, test leads, and retry test. Check source of AC line power. Check or replace AC Power Adapter. Check, repair, or restore proper internal wire routing.
	UUT fails earth leakage test	Verify instructions, setup, test leads, and retry test. Check source of AC line power. Check or replace AC Power Adapter. Check, repair, or restore proper internal wire routing.
	UUT fails source leakage test	Verify instructions, setup, test leads, and retry test. Check source of AC line power. Check or replace AC Power Adapter. Check, repair, or restore proper internal wire routing.
	UUT fails sink leakage test	Verify instructions, setup, test leads, and retry test. Check source of AC line power. Check or replace AC Power Adapter. Check, repair, or restore proper internal wire routing.

Using the Service/Status Features

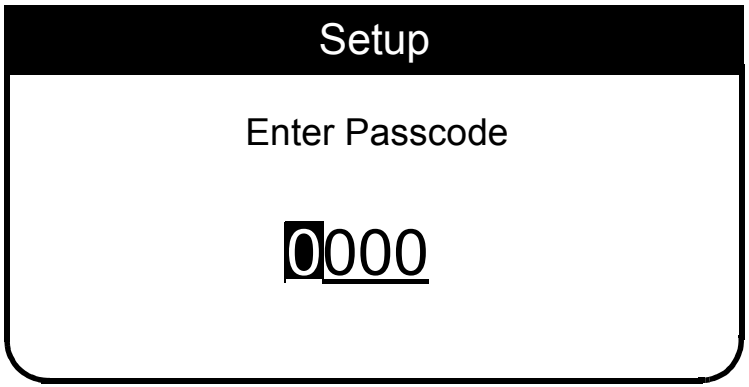
Introduction

The device includes a series of service/status screens and menus that detail device data such stored manufacturing data, recorded errors, and counters for shock and pacing operation.

Displaying the SERVICE/STATUS Menu

To display the SERVICE/STATUS Menu:

1. Hold down both the OPTIONS and EVENT controls, then turn on the device. Continue holding until the SETUP Passcode overlay appears.

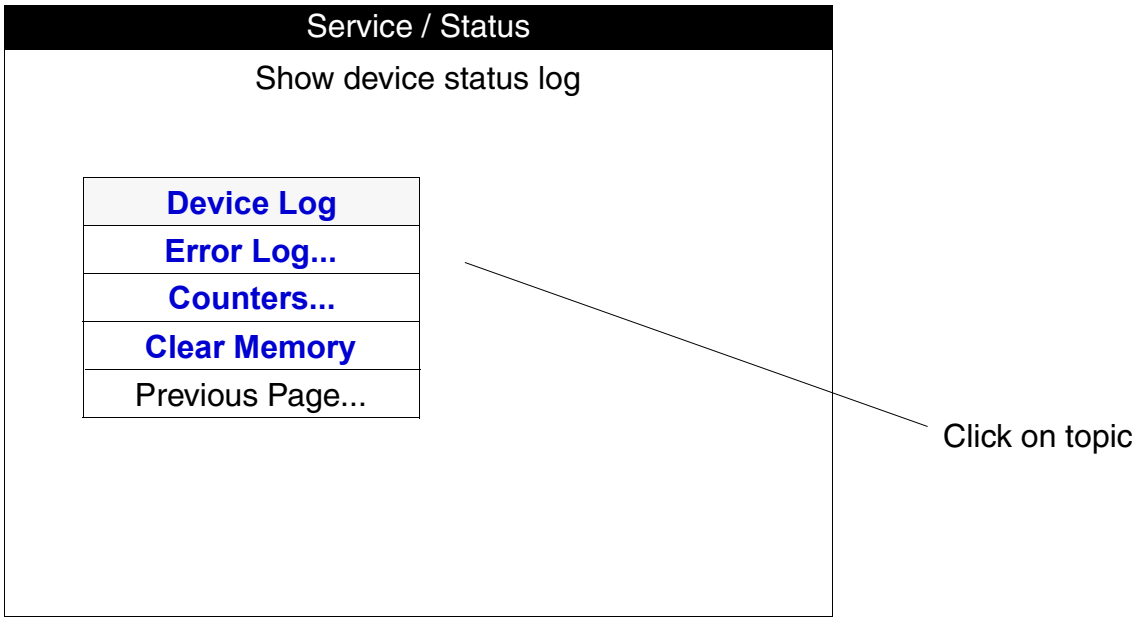


2. Enter the passcode 5433 by rotating the Selector to select a digit, then pressing the Selector to continue. After the last digit is entered, the SETUP Menu appears.

Using the Service/Status Features

Displaying the SERVICE/STATUS Menu (continued)

3. Rotate the Selector to select SERVICE on the SETUP Menu, then press the Selector. The SERVICE Passcode overlay appears. Enter the passcode 5433.
4. Rotate the Selector to select STATUS, then press the Selector to display the SERVICE/STATUS Menu.
5. Select the desired topic from the SERVICE/STATUS Menu.



About the Device Log

Introduction

The Device Log displays essential device characteristics such as the serial number, and accumulative device operations such as the shock count.

Displaying the Device Log

To display the Device Log:

1. **Display the** SERVICE/STATUS Menu.
2. Using the Selector, navigate to: SERVICE/STATUS/DEVICE LOG.

Service / Status / Device Log	
Serial Number	8244381
Dash Number	(not used)
Manufacturing Date	18 Aug 99
Software Revision	3011371-000
Fault Messages	No
Power Cycle Count	558
Pacing Count	4112
Shock Count	739
Power On Time	74.2
Printer On Time	1.4
SpO2 Operating Time	10.5
Defib Storage Cap Value	52uF

Press Selector knob to exit

About the Device Log

Device Log Entries

Each entry in the Device Log is described below.

- Serial Number – Records the serial number that is stored in the device. If the serial number is blank, then the device has lost important configuration data. See **Verifying the Configuration Data**. If this serial number does not agree with the serial number on the device label in Battery Well 1, then you have a device manufactured before April 30, 1998, after which the label serial number and the stored serial number were brought into alignment.
- Dash Number – (Not used.)
- Manufacturing Date – Records the date when the device was manufactured, specifically, when the operating software was loaded. If the manufacturing date is recorded as 01 Jan 1970, then either the device configuration data has been lost (see **Verifying the Configuration Data**) or you have a device manufactured before March 21, 1998.
- Software Revision – Records the current version of the device operating software. The number 3011371 is fixed, while the extension number changes with each software version.
- Fault Message – Records YES or NO to whether there are any error codes stored in the Error Code Log. (See **Processing Error Codes**.)

About the Device Log

Device Log Entries (continued)

- Power Cycle Count – Records the number of times the device has been turned on.
- Pacing Count – Records the total pacing pulses delivered by the device.
- Shock Count – Records the total times the device defibrillation capacitor has been charged.
- Power On Time – Records the total device power-on time.
- Printer On Time – Records the total printer running time.
- SpO2 Operating Time – Records the total SpO2 running time.
- Defib Storage Cap Value – Records the calculated value of the defibrillation capacitor. This value is calculated by the device when you complete the **TCP — Defibrillator Self Calibration** procedure. The nominal value is 52 uF. If the calculated value of the defibrillation capacitor is below calibration levels, the device will not calibrate and an error message appears on the screen. This is an indication to replace the capacitor. See the **A15 Energy Storage Capacitor Replacement** procedure.

About the Error Log

Introduction

The device operating software is designed to detect and report any improper operation or device malfunction by using a system of error codes. When an error condition is detected, the device writes a specific 4-digit hexadecimal number into the device Error Code Log – 500e for example – and then lights the front panel SERVICE indicator. The lighting of the SERVICE indicator is your signal to examine the Error Code Log and process any reported errors.

Displaying the Error Code Log

To display the Error Code Log:

1. **Display the** SERVICE/STATUS Menu.
2. Using the Selector, navigate to SERVICE/STATUS/ERROR LOG.
3. Proceed or return to **Processing Error Codes**.

Clearing the Error Code Log

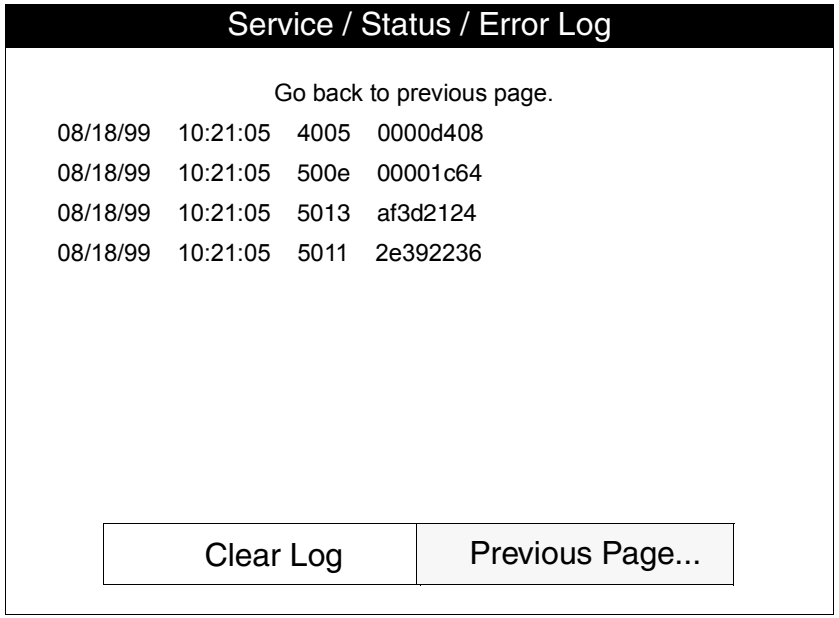
To clear the Error Code Log:

1. **Display the** SERVICE/STATUS Menu.
2. Using the Selector, navigate to SERVICE/STATUS/ERROR LOG.
3. Use the Selector to choose CLEAR LOG.
4. Turn off the device or navigate to other service topics, as required.

About the Error Log

How Error Codes are recorded in the Error Log

The SERVICE/STATUS/ERROR LOG displays errors by date, time, error, and error extension. For example, you might see the following errors when you review recorded errors (see **Processing Error Codes**):



Error Code extensions, for example 0000d408, indicate information regarding the error. This might include a memory address, coded response, or similar indication. Error Code extensions are defined for the a017 and a018 error codes because the extensions are fixed. For other errors, the extensions are variable.

About Counters

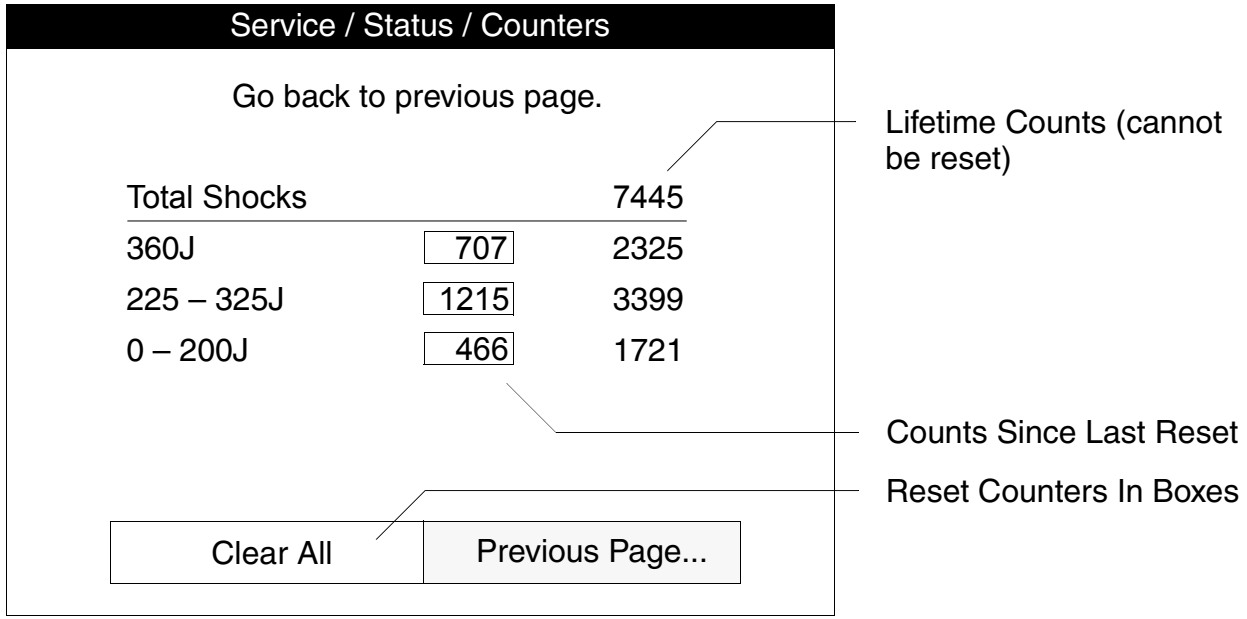
Introduction

The device counters display the number of shocks delivered in both sub-total and running-total counts.

Displaying the Counters

To display the counters:

1. **Display the** SERVICE/STATUS Menu.
2. Using the Selector, navigate to: SERVICE/STATUS/COUNTERS.



About Counters

Understanding the Counters

The SERVICE/STATUS/COUNTERS screen shows the following counters:

- Total Shocks – This is a running total of all the shocks ever delivered by the device. This counter cannot be reset.
- 360 J Shocks – The boxed number represents the number of 360 J shocks delivered since the last reset. The unboxed number is a running total of all 360 J shocks ever delivered by the device (cannot be reset).
- 300 J Shocks – The boxed number represents the number of 300 J shocks delivered since the last reset. The unboxed number is a running total of all 300 J shocks ever delivered by the device (cannot be reset).
- ≤200 J Shocks – The boxed number represents the number of 200 J, or less, shocks delivered since the last reset. The unboxed number is a running total of all ≤200 J shocks ever delivered by the device (cannot be reset).

Resetting the Counters

With the SERVICE/STATUS/COUNTERS screen displayed, rotate the Selector to CLEAR ALL and press the Selector. This resets the boxed sub-total counters, but not the running-total counters. You can also reset the counters using the **Clear Memory** feature.

About Clear Memory

Introduction

The Clear Memory feature is used to clear the FLASH data management memory on the A02 Memory PCB. Specifically, you clear:

- ECG Data – All stored ECG data (up to 45 minutes of First-In-First-Out continuous ECG waveforms) is permanently deleted.
- Patient Reports – All stored patient reports are permanently deleted.

Normally you clear the data management memory after the device is placed into new or different use, and the old patient data is no longer required. You also clear the data management memory as part of some service actions.

Note: To save important patient data before clearing the data management memory, transmit the data to a receiving device or print out individual patient data (see the **Operating Instructions – Data Management**).

Clearing the Data Management Memory

To clear the Data Management Memory (this is permanent; there is no undo):

1. **Display the** SERVICE/STATUS Menu.
2. Rotate the Selector to CLEAR MEMORY and press. A count-down timer appears to indicate the clearing process, which requires a nominal 30 seconds.

Processing Error Codes

Introduction

The LIFEPAK 12 defibrillator/monitor logs an error code and lights the SERVICE indicator whenever an internal program or process fails to execute properly. Errors rarely occur and should be investigated thoroughly by qualified service personnel before a device that displayed an error code is placed back into active use. Always complete the **Performance Inspection Procedure (PIP)** after encountering and clearing any error code(s).

Error codes stored in the Error Code Log may not necessarily indicate a permanent error. Error codes can indicate transient electromagnetic interference (EMI) or electrostatic discharge (ESD). If you suspect transient EMI or ESD as the source of an error, **Clear Error Code(s)**, then shut down and restart the device. If the error code does not recur, it may be the result of EMI or ESD.

Processing Error Codes

Processing a specific Error Code

To process an Error Code:

1. Review error codes by **Displaying the Error Code Log**. Record any errors, including the date, time, error, and error extension.
2. Use the Selector to choose CLEAR LOG, then turn off the device.
3. Complete the **Performance Inspection Procedure (PIP)**. If completed successfully, go to Step 4. If the SERVICE indicator lights at any time during the PIP, stop the PIP, then continue to Step 5.
4. By virtue of passing the PIP, the device may be returned to regular use. The error code(s) may have been related to EMI or ESD. If the errors repeat, continue this procedure starting at Step 5.
5. Compare your PIP failure with the **Troubleshooting Chart**. Review the error codes against the **Error Code Categories** for general information and the **Error Code Table** for a corresponding corrective action. Service the device based on these inputs, then repeat the **PIP**.
6. For persistent error codes, contact your local Medtronic Physio-Control service or sales representative.

Error Code Categories

Error codes are organized in 14 categories in 4-digit hexadecimal format:

Initial Digit	Category	Description	Associated PCBs and Assemblies
0xxx	UT	Utilities	A01 System, A02 Memory
1xxx	UI	User Interface	A01 System, A02 Memory, A04 Therapy, A05 Interface, A09 Small Keypad, A10 Large Keypad
2xxx	DC	Data Communications	A01 System, A02 Memory
3xxx	DM	Data Management	A01 System, A02 Memory
4xxx	SM	System Monitor	A01 System, A02 Memory, A04 Therapy
5xxx	PC	Processor Control	A01 System, A02 Memory
6xxx	ECG	ECG	A01 System, A02 Memory
7xxx	SAS	SAS	A01 System, A02 Memory
8xxx	L12	12-Lead ECG	A01 System, A02 Memory
9xxx	PPxx	Patient Parameter – SpO2, CO2, or NIBP	A01 System, A06 OEM PCB, A16 SpO2 Module, A21 NIBP Module, A23 CO2 Module
axxx	TH, DE, PA	Therapy, Defibrillation, Pacing	A01 System, A04 Therapy, A13 Transfer Relay Assembly, A15 Energy Storage Capacitor
bxxx	PR	Printer	A01 System, A02 Memory, A12 Printer Assembly
cxxx	PM	Power Management	A01 System, A02 Memory, A03 Power
dxxx	SC	Serial Communications	A01 System, A02 Memory, A04 Therapy

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
0001	UT_ERROR_FLASH_ADDRESS			2, 1
0002	UT_ERROR_FLASH_VPP			2, 1
0003	UT_ERROR_FLASH_ERASE			2
0004	UT_ERROR_FLASH_8BIT_WRITE			1
0005	UT_ERROR_FLASH_16BIT_WRITE			2
0006	UT_ERROR_FLASH_PAGE_WRITE			2
0007	UT_ERROR_ADC_CHANNEL			1
0008	UT_ERROR_ADC_READ			1
0009	UT_ERROR_DAC_ACCESS			1
000a	UT_ERROR_DAC_FAILURE			1
000b	UT_ERROR_AIO_SEM_NOT_CREATED			2, 1
000c	UT_ERROR_ADC_TEST_REG			1
000d	UT_ERROR_ADC_CAL_NOT_COMPLETE			1
000e	UT_ERROR_VP_FLASH_ID_UNKNOWN			2, 1
000f	UT_ERROR_DP_FLASH_ID_UNKNOWN			2, 1
1001	UI_ERROR_TIMEOUT_TABLE_FULL			1
1002	UI_ERROR_NO_TIMEOUT_SEMAPHORE			1
1003	UI_ERROR_BAD_MANUAL_ACCESS			1
1004	UI_ERROR_PADDLE_SHOCK_SEEN			11, 8, 6, 1
1005	UI_ERROR_DISPLAY_SELF_TEST			1
1006	UI_ERROR_ENERGY_FAULT			10, 6, 1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
1007	UI_ERROR_12LEAD_KEY_SEEN			11, 8, 4,1
1008	UI_ERROR_ANALYZE_KEY_SEEN			11, 8, 4,1
1009	UI_ERROR_ADVISORY_KEY_SEEN			11, 8, 4,1
100a	UI_ERROR_NIBP_KEY_SEEN			11, 8, 4,1
100b	UI_ERROR_CURRENTUP_KEY_SEEN			11, 8, 4,1
100c	UI_ERROR_CURRENTDOWN_KEY_SEEN			11, 8, 4,1
100d	UI_ERROR_RATEUP_KEY_SEEN			11, 8, 4,1
100e	UI_ERROR_RATEDOWN_KEY_SEEN			11, 8, 4,1
100f	UI_ERROR_PACER_KEY_SEEN			11, 8, 4,1
1010	UI_ERROR_PAUSE_KEY_SEEN			11, 8, 4,1
1011	UI_ERROR_INVALID_CPR_TIME			1
1012	UI_ERROR_INVALID_AED_STATE			1
1013	UI_ERROR_INVALID_SAS_STATUS			1
1014	UI_ERROR_INVALID_SILENCE			1
1015	UI_ERROR_INVALID_CORNER			1
1016	UI_ERROR_INVALID_FILL_COLOR			1
1017	UI_ERROR_INVALID_TH_STATUS			1
1018	UI_ERROR_INVALID_SEQUENCE_COUNT			1
1019	UI_ERROR_INVALID_MENU_CALLBACK			1
101a	UI_ERROR_INVALID_KNOB_STATE			1
101b	UI_ERROR_INVALID_PADDLES_DEFAULT			1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
101c	UI_ERROR_INVALID_STYLE			1
101d	UI_ERROR_INVALID_LED_STATE			1
101e	UI_ERROR_INVALID_LED			1
101f	UI_ERROR_INVALID_CHANNEL			1
1020	UI_ERROR_INVALID_WAVE_2			1
1021	UI_ERROR_INVALID_WAVE_3			1
1022	UI_ERROR_INVALID_MENU_MODE			1
1023	UI_ERROR_INVALID_DATA_SIZE			1
1024	UI_ERROR_INVALID_SUB_FIELD			1
1025	UI_ERROR_INVALID_REPORT_TYPE			1
1026	UI_ERROR_INVALID_PACER_MODE			1
1027	UI_ERROR_INVALID_ALARM_STATE			1
1028	UI_ERROR_INVALID_QRS_STATE			1
1029	UI_ERROR_INVALID_PP_STATUS			1
102a	UI_ERROR_INVALID_PR_STATUS			1
102b	UI_ERROR_INVALID_SERVICE_STATE			1
102c	UI_ERROR_INVALID_KEY_STYLE			1
102d	UI_ERROR_INVALID_TONE			1
102e	UI_ERROR_INVALID_MENU_TIMEOUT			1
102f	UI_ERROR_INVALID_BATTERY_CAPACITY			1
1030	UI_ERROR_INVALID_DC_STATUS			1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
1031	UI_ERROR_INVALID_L12_STATUS			1
1032	UI_ERROR_INVALID_WARNING_TONE			1
1033	UI_ERROR_INVALID_WARNING_TYPE			1
1034	UI_ERROR_CREATE_TIMEOUT_SEMAPHORE			1
1035	UI_ERROR_INVALID_TIMEOUT_SEMAPHORE			1
1036	UI_ERROR_CREATE_EVENT_QUEUE			1
1fff	UI_ERROR_EXTRA_INFORMATION			9
2001	DC_ERROR_UNKNOWN			31, 32, 2, 1
2002	DC_ERROR_DC_MSG_QUEUE_CREATE			31, 32, 2, 1
2003	DC_ERROR_RING_BUFFER_CREATE			31, 32, 2, 1
2004	DC_ERROR_UNABLE_TO_INITIATE_SERIAL_PORT			31, 32, 2, 1
2005	DC_ERROR_UNABLE_TO_INITIATE_PCMCIA			31, 32, 2, 1
2006	DC_ERROR_UNABLE_CLOSE_PC_CARD_FD			31, 32, 2, 1
2007	DC_ERROR_UNABLE_TO_ACCESS_MSG_Q			31, 32, 2, 1
2008	DC_ERROR_UNSUCCESSFUL_DEVICE_READ			31, 32, 2, 1
2009	DC_ERROR_UNSUCCESSFUL_RING_BUFFER_READ			31, 32, 2, 1
200a	DC_ERROR_UNSUCCESSFUL_RING_BUFFER_WRITE			31, 32, 2, 1
200b	DC_ERROR_UNSUCCESSFUL_DEVICE_WRITE			31, 32, 2, 1
200c	DC_ERROR_UNKNOWN_FD_DURING_QUERY			31, 32, 2, 1
200d	DC_ERROR_UNKNOWN_FD_DURING_WRITE			31, 32, 2, 1
200e	DC_ERROR_UNABLE_TO_COMPLETE_WRITE			31, 32, 2, 1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
200f	DC_ERROR_UNKNOWN_ACCESSOR			31, 32, 2, 1
2010	DC_ERROR_UP_TO_APP_MSG_QUEUE_WRITE			31, 32, 2, 1
2011	DC_ERROR_UNABLE_TO_INIT_UART_FOR_DIRECT_XFER			31, 32, 2, 1
2012	DC_ERROR_UNABLE_TO_RESET_UART_FOR_DIRECT_XFER			31, 32, 2, 1
2013	DC_ERROR_UNABLE_TO_INIT_UART_FOR_EXT_XFER			31, 32, 2, 1
2014	DC_ERROR_UNABLE_TO_RESET_UART_FOR_EXT_XFER			31, 32, 2, 1
2015	DC_ERROR_UNABLE_TO_GET_DM_REPORT			31, 32, 2, 1
2016	DC_ERROR_DOWN_TO_SESSION_MSG_QUEUE_WRITE			31, 32, 2, 1
3001	DM_ERROR_UNKNOWN			31, 2
3002	DM_ERROR_MAIN_CREATING_SEM			31, 2
3003	DM_ERROR_MAIN_BAD_BOOT			31, 2
3004	DM_ERROR_MAIN_QUEUE_FULL			31, 2
3005	DM_ERROR_DATABASE_ERASE_ADJUST			31, 2
3006	DM_ERROR_DATABASE_ERASE_FAILED			31, 2
3007	DM_ERROR_DATABASE_ERASE_VERIFY			31, 2
3008	DM_ERROR_DATABASE_FLASH_ERASE			31, 2
3009	DM_ERROR_DATABASE_CREATE_SEM			31, 2
300a	DM_ERROR_DATABASE_EPISODE_END			31, 2
300b	DM_ERROR_DATABASE_FLASH_BAD			31, 2
300c	DM_ERROR_DATABASE_WRITE_HEADER			31, 2
300d	DM_ERROR_DATABASE_WRITE_CONTENT			31, 2

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
300e	DM_ERROR_DATABASE_REWRITE_HDR			31, 2
300f	DM_ERROR_DATABASE_REWRITE_WF			31, 2
3010	DM_ERROR_DATABASE_REWRITE_VS			31, 2
3011	DM_ERROR_DATABASE_REWRITE_CONT			31, 2
3012	DM_ERROR_DATABASE_REWRITE_DELTA			31, 2
3013	DM_ERROR_DATABASE_VERIFY_HEADER			31, 2
3014	DM_ERROR_DATABASE_VERIFY_CONTENT			31, 2
3015	DM_ERROR_DATABASE_READ_CRC			31, 2
3016	DM_ERROR_BUFFER_ZEROED			31, 2
3017	DM_ERROR_BUFFER_FALLING_BEHIND			31, 2
3018	DM_ERROR_SCP_INIT_FAIL			31, 2
3019	DM_ERROR_SCP_BUFFER_OVERRUN			31, 2
301a	DM_ERROR_BAD_LINKED_LIST			31, 2
301b	DM_ERROR_SCP_MEM_OVERRUN			31, 2
301c	DM_ERROR_SCP_MM_SEM_FAILED			31, 2
301d	DM_ERROR_CHECK_NO_TYPE			31, 2
301e	DM_ERROR_CHECK_BAD_TYPE			31, 2
301f	DM_ERROR_CHECK_BAD_CRC			31, 2
3020	DM_ERROR_CHECK_NEWEST_FIND			31, 2
3021	DM_ERROR_CHECK_OLDEST_FIND			31, 2
3022	DM_ERROR_CHECK_EVENT_ID			31, 2

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
3023	DM_ERROR_CHECK_REST_BLOCK			31, 2
3024	DM_ERROR_MAIN_PKT_SEM			31, 2
3025	DM_ERROR_MAIN_CBUFFER_SEM			31, 2
3026	DM_ERROR_CHECK_OLDEST_TOTAL			31, 2
3027	DM_ERROR_CHECK_NEWEST_TOTAL			31, 2
3028	DM_ERROR_DELETE_EPISODE			31, 2
3029	DM_ERROR_STORE_VITAL_SIGNS			31, 2
302a	DM_ERROR_STORE_WRITE			31, 2
302b	DM_ERROR_DATABASE_RESET			31, 2
302c	DM_ERROR_CHECK_FIRST_RECORD			31, 2
302d	DM_ERROR_SCP_LEAD_ERROR			31, 2
302e	DM_ERROR_CHECK_EPISODE			31, 2
302f	DM_ERROR_STORAGE_OPEN			31, 2
3030	DM_ERROR_STORAGE_CLOSE			31, 2
3031	DM_ERROR_STORAGE_ERASE			31, 2
3032	DM_ERROR_STOARGE_CLEAR			31, 2
3033	DM_ERROR_STORAGE_WRITE			31, 2
3034	DM_ERROR_STORAGE_READ			31, 2
3035	DM_ERROR_STORAGE_CRC			31, 2
3036	DM_ERROR_STORE_WFSEM_TIMEOUT			31, 2
3037	DM_ERROR_STORE_SEM_TIMEOUT			31, 2

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
3038	DM_ERROR_DATABASE_SEM_TIMEOUT			31, 2
3039	DM_ERROR_FLASH_SEM_TIMEOUT			31, 2
303a	DM_ERROR_CONTECG_SEM_TIMEOUT			31, 2
303b	DM_ERROR_BUFFER_SEM_TIMEOUT			31, 2
303C	DM_ERROR_BUFFER_SEM_CREATE			31, 2
3fff	DM_ERROR_EXTRA_INFORMATION			31, 2
4001	SM_ERROR_INIT_UNKNOWN_TASK_ID			4, 2, 1
4002	SM_ERROR_UNKNOWN_TASK_ID			4, 2, 1
4003	SM_ERROR_TASK_SUSPENDED			4, 2, 1
4004	SM_ERROR_TASK_NOT_FOUND			4, 2, 1
4005	SM_ERROR_LOG_CRC			8, 1
4006	SM_ERROR_LOG_MSGQ_NOT_CREATED			2, 1
4007	SM_ERROR_LOG_MSGQ_ERROR			2, 1
4008	SM_ERROR_LOG_LENGTH			2, 1
4009	SM_ERROR_RAM_FAILURE			4, 6, 1
400a	SM_ERROR_BAD_CRC			4, 6, 1
400b	SM_ERROR_CRC_FAILURE			4, 6, 1
400c	SM_ERROR_VOLTAGE_LOW			4, 6, 1
400d	SM_ERROR_VOLTAGE_HIGH			4, 6, 1
400e	SM_ERROR_STACK_LOW			4, 6, 1
400f	SM_ERROR_TASK_INFO_GET			4, 6, 1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
4010	SM_ERROR_SERVICE_LED			4, 6, 1
4011	SM_ERROR_DEFIB_SERVICE_SYNC			4, 6, 1
4012	SM_ERROR_FONT_VOICE_CKSUM			4, 6, 1
4013	SM_ERROR_FONT_VOICE_CRC			4, 6, 1
5001	PC_ERROR_SYNC_SEM_NOT_CREATED			2, 1
5002	PC_ERROR_WATCHDOG_SHORT_FAILURE			1
5003	PC_ERROR_WATCHDOG_LONG_FAILURE			1
5004	PC_ERROR_WATCHDOG_UNEXPECTED			1
5005	PC_ERROR_RAM_AT_BOOT			8, 2, 1
5006	PC_ERROR_BAD_CHECKSUM			1
5007	PC_ERROR_RTC_SEM_NOT_CREATED			2, 1
5008	PC_ERROR_NVRAM_SEM_NOT_CREATED			2, 1
5009	PC_ERROR_TASK_NOT_SPAWNED			2, 1
500a	PC_ERROR_TASK_INIT_TIMEOUT			2, 1
500b	PC_ERROR_TASK_INIT_SEMAPHORE			2, 1
500c	PC_ERROR_TASK_DELINQUENT			1
500d	PC_ERROR_CONFIG_VERSION			1
500e	PC_ERROR_CONFIG_CRC			8, 1
500f	PC_ERROR_CONFIG_LIMIT			1
5010	PC_ERROR_CREATE_WATCHDOG			2, 1
5011	PC_ERROR_METERS_VERSION			8, 1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
5012	PC_ERROR_METERS_CRC			1
5013	PC_ERROR_MFG_DATA_VERSION			8, 1
5014	PC_ERROR_MFG_DATA_CRC			1
5015	PC_ERROR_FORCED_RESET_FAILED			1
5016	PC_ERROR_BAD_SHUTDOWN_TIME			1
5017	PC_ERROR_BAD_ABS_SHUTDOWN_TIME			1
5018	PC_ERROR_PACER_POWER_CONTROL			6, 1
5019	PC_ERROR_RTC_BAD			1
501a	PC_ERROR_RTC_DRIFT			1
501b	PC_ERROR_EXC_UNKNOWN			2, 1
501c	PC_ERROR_EXC_PARALLEL			2, 1
501d	PC_ERROR_EXC_TRACE_INSTRUCTION			2, 1
501e	PC_ERROR_EXC_TRACE_BRANCH			2, 1
501f	PC_ERROR_EXC_TRACE_CALL			2, 1
5020	PC_ERROR_EXC_TRACE_RETURN			2, 1
5021	PC_ERROR_EXC_TRACE_PRERETURN			2, 1
5022	PC_ERROR_EXC_TRACE_SUPERVISOR			2, 1
5023	PC_ERROR_EXC_TRACE_MARK			2, 1
5024	PC_ERROR_EXC_TRACE_UNKNOWN			2, 1
5025	PC_ERROR_EXC_OP_INVALID_OPCODE			2, 1
5026	PC_ERROR_EXC_OP_UNIMPLEMENTED			2, 1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
5027	PC_ERROR_EXC_OP_UNALIGNED			2, 1
5028	PC_ERROR_EXC_OP_INVALID_OPERAND			2, 1
5029	PC_ERROR_EXC_OP_UNKNOWN			2, 1
502a	PC_ERROR_EXC_ARITH_OVERFLOW			2, 1
502b	PC_ERROR_EXC_ARITH_ZERO_DIVIDE			2, 1
502c	PC_ERROR_EXC_ARITH_UNKNOWN			2, 1
502d	PC_ERROR_EXC_CONSTRAINT			2, 1
502e	PC_ERROR_EXC_PROTECTION			2, 1
502f	PC_ERROR_EXC_TYPE			2, 1
5030	PC_ERROR_CRITICAL_DATA_CORRUPT			1
5100	PC_ERROR_UT_DELINQUENT			21
5101	PC_ERROR_UI_DELINQUENT			21
5102	PC_ERROR_DC_DELINQUENT			21
5103	PC_ERROR_DM_DELINQUENT			21
5104	PC_ERROR_SM_DELINQUENT			21
5105	PC_ERROR_PC_DELINQUENT			21
5106	PC_ERROR_ECG_DELINQUENT			21
5107	PC_ERROR_SAS_DELINQUENT			21
5108	PC_ERROR_L12_DELINQUENT			21
5109	PC_ERROR_PP_DELINQUENT			21
510a	PC_ERROR_TH_DELINQUENT			21

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
510b	PC_ERROR_PR_DELINQUENT			21
510c	PC_ERROR_PM_DELINQUENT			21
510d	PC_ERROR_SC_DELINQUENT			21
6001	ECG_ERROR_X			2, 1
6002	ECG_ERROR_MSG_QUEUE_CREATE			1
6003	ECG_ERROR_MSG_QUEUE_SEND			1
6004	ECG_ERROR_MSG_QUEUE_RECEIVE			1
6005	ECG_ERROR_CONNECT_SYS_INT			1
6006	ECG_ERROR_CONNECT_PKT_INT			1
6007	ECG_ERROR_SAS_MOTION_QUEUE_SEND			1
6008	ECG_ERROR_SAS_ECG_QUEUE_SEND			1
6009	ECG_ERROR_CREATE_WATCHDOG			1
600a	ECG_ERROR_SEMAPHORE_CREATE			1
600b	ECG_ERROR_CMD_QUEUE_FULL			1
600c	ECG_ERROR_DSP_VOLTAGE			1
600d	ECG_ERROR_PREAMP_CALIBRATION			20
600e	ECG_ERROR_NVRAM_FAULT			20
7001	SAS_ERROR_X			2, 1
7002	SAS_ERROR_WDOG_STATUS			1
7003	SAS_ERROR_WDOG_CREATE			1
7004	SAS_ERROR_INVALID_CMND			1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
7005	SAS_ERROR_INVALID_STATE			1
7006	SAS_ERROR_LIMIT_CTR_PTR			1
7007	SAS_ERROR_INVALID_TI_COMMAND			5
7008	SAS_ERROR_TI_COMMAND_NOT_IDLE			5
7009	SAS_ERROR_TI_REQUEST_WRITE			5
700a	SAS_ERROR_TI_MSGQ_NOT_CREATED			1
700b	SAS_ERROR_TI_QUEUE_READ			5, 1
700c	SAS_ERROR_UI_QUEUE_READ			1
700d	SAS_ERROR_UI_COMMAND_NOT_IDLE			4
700e	SAS_ERROR_INVALID_UI_COMMAND			1
700f	SAS_ERROR_UI_QUEUE_WRITE			4, 1
7010	SAS_ERROR_ECG_FALLING_BEHIND			3
7011	SAS_ERROR_IMP_FALLING_BEHIND			3
7012	SAS_ERROR_UI_MSGQ_NOT_CREATED			1
7013	SAS_ERROR_COULD_NOT_INIT			1
8001	L12_ERROR_UNKNOWN			28, 2, 1
8002	L12_ERROR_ANALYSIS_SEMAPHORE			28
8003	L12_ERROR_STATE_SEMAPHORE			28
8004	L12_ERROR_QUEUING_COMMANDS			28, 3
8005	L12_ERROR_CREATING_QUEUE			28
8006	L12_ERROR_UNKNOWN_START			28, 5

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
8007	L12_ERROR_UNKNOWN_COMMAND			28, 5
8008	L12_ERROR_BAD_STATE			28, 1
8009	L12_ERROR_FALLING_BEHIND			28, 3
9001	PPSP_ERROR_OPEN_DEVICE			33, 12, 1
9002	PPSP_ERROR_MODULE			33, 12, 1
9003	PPSP_ERROR_PLETHYSMOGRAPH_INVALID			33, 12, 1
9004	PPSP_ERROR_INVALID_FAST_MSG			33, 12, 1
9005	PPSP_ERROR_VERSION_MSG_LENGTH			33, 12, 1
9006	PPSP_ERROR_INVALID_SLOW_MSG			33, 12, 1
9007	PPSP_ERROR_SLOW_DATA_LENGTH			33, 12, 1
9008	PPSP_ERROR_SLOW_MSG_LENGTH			33, 12, 1
9009	PPSP_ERROR_SLOW_MSG_CHECKSUM			33, 12, 1
900a	PPSP_ERROR_COMMUNICATION			33, 12, 1
900b	PPSP_ERROR_MFG_ID			33, 12, 1
900c	PPSP_ERROR_WRITING_TO_MODULE			33, 12, 1
900d	PPSP_ERROR_SpO2_VALUE			33, 12, 1
900e	PPSP_ERROR_CONFIG			33, 12, 1
900f	PPSP_ERROR_RAW_IOCTL_FAILED			33, 12, 1
9010	PPSP_ERROR_PARITY_IOCTL_FAILED			33, 12, 1
9011	PPSP_ERROR_ENABLE_IOCTL_FAILED			33, 12, 1
9012	PPSP_ERROR_FLUSH_IOCTL_FAILED			33, 12, 1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
9013	PPSP_ERROR_POLL_IOCTL_FAILED			33, 12, 1
9014	PPSP_ERROR_READ_FAILED			33, 12, 1
9015	PPSP_ERROR_WRITE_FAILED			33, 12, 1
9016	PPSP_ERROR_SELECT_FAILED			33, 12, 1
9017	PPSP_ERROR_WRONG_LENGTH_WRITTEN			33, 12, 1
9018	PPSP_ERROR_OVER_CURRENT			33, 12, 1
9019	PPSP_ERROR_RAM			33, 12, 1
901a	PPSP_ERROR_ROM			33, 12, 1
901b	PPSP_ERROR_UNKNOWN			33, 12, 1
9101	PPNI_ERROR_OPEN_DEVICE			34, 22
9102	PPNI_ERROR_CHECKSUM			34, 22
9103	PPNI_ERROR_COMMUNICATION			34, 22
9104	PPNI_ERROR_MFG_ID			34, 22
9105	PPNI_ERROR_WRITING_TO_MODULE			34, 22
9106	PPNI_ERROR_CONFIG			34, 22
9107	PPNI_ERROR_SELF_TEST_FAILED			34, 22
9108	PPNI_ERROR_RAW_IOCTL_FAILED			34, 22
9109	PPNI_ERROR_PARITY_IOCTL_FAILED			34, 22
910a	PPNI_ERROR_ENABLE_IOCTL_FAILED			34, 22
910b	PPNI_ERROR_FLUSH_IOCTL_FAILED			34, 22
910c	PPNI_ERROR_POLL_IOCTL_FAILED			34, 22

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
910d	PPNI_ERROR_SERIAL_READ_FAILED			34, 22
910e	PPNI_ERROR_WRITE_FAILED			34, 22
910f	PPNI_ERROR_SELECT_FAILED			34, 22
9110	PPNI_ERROR_WRONG_LENGTH_WRITTEN			34, 22
9111	PPNI_ERROR_RING_BUFF_CREATE_FAILED			34, 22
9112	PPNI_ERROR_RING_BUFFER_WRITE_FAILED			34, 22
9113	PPNI_ERROR_INCORRECT_RESULTS_STATUS			34, 22
9114	PPNI_ERROR_BAD_PRESSURE_SELECTED			34, 22
9115	PPNI_ERROR_BAD_INTERVAL_SELECTED			34, 22
9116	PPNI_ERROR_MODULE_BELLY_UP			34, 22
9117	PPNI_ERROR_MODULE_NOT_RESPONDING			34, 22
9118	PPNI_ERROR_LEAKAGE_TEST_FAILED			34, 22
9119	PPNI_ERROR_CONFIG_MISMATCH			34, 22
9201	PPCO_ERROR_OPEN_DEVICE			35, 23
9202	PPCO_ERROR_CHECKSUM			35, 23
9203	PPCO_ERROR_COMMUNICATION			35, 23
9204	PPCO_ERROR_MFG_ID			35, 23
9205	PPCO_ERROR_WRITING_TO_MODULE			35, 23
9206	PPCO_ERROR_CONFIG			35, 23
9207	PPCO_ERROR_RAW_IOCTL_FAILED			35, 23
9208	PPCO_ERROR_PARITY_IOCTL_FAILED			35, 23

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
9209	PPCO_ERROR_ENABLE_IOCTL_FAILED			35, 23
920a	PPCO_ERROR_FLUSH_IOCTL_FAILED			35, 23
920b	PPCO_ERROR_POLL_IOCTL_FAILED			35, 23
920c	PPCO_ERROR_READ_FAILED			35, 23
920d	PPCO_ERROR_WRITE_FAILED			35, 23
920e	PPCO_ERROR_SELECT_FAILED			35, 23
920f	PPCO_ERROR_WRONG_LENGTH_WRITTEN			35, 23
a001	TH_ERROR_ERROR_UNKNOWN			10
a002	TH_ERROR_DEFIB_LINK_DOWN			10
a003	TH_ERROR_PACER_LINK_DOWN			10
a004	TH_ERROR_UNEXPECTED_ENERGY			10
a005	TH_ERROR_CAP_OVERCHARGED			10
a006	TH_ERROR_WRONG_DEFIB_MODE			10
a007	TH_ERROR_WRONG_DEFIB_STATE			10
a008	TH_ERROR_DEFIB_DISABLE			10
a009	TH_ERROR_UNKOWN_DE_RESPOND			10
a00a	TH_ERROR_DE_WRONG_ENG_SELECT			10
a00b	TH_ERROR_SHOCK_NOT_DELIVERED			10
a00c	TH_ERROR_WRONG_TRANSFER_REQUEST			10
a00d	TH_ERROR_CHARGING_EXPIRED			10
a00e	TH_ERROR_WRONG_CHARGE_REQUEST			10

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
a00f	TH_ERROR_CAP_OUT_OF_RANGE			10
a010	TH_ERROR_PA_RATE_OUT_OF_RANGE			10
a011	TH_ERROR_PA_CURRENT_OUT_OF_RANGE			10
a012	TH_ERROR_PA_MISS_RATE			10
a013	TH_ERROR_PA_MISS_CURRENT			10
a014	TH_ERROR_DE_MISS_ENERGY			10
a015	TH_ERROR_MSGQ_NOT_CREATED			10
a016	TH_ERROR_MSG_CHECKSUM			10
a017	TH_ERROR_DEFIB	00000001	DE_ERR_LONG_WDT	10
		00000002	DE_ERR_SHORT_WDT	10
		00000003	DE_ERR_SCI_RCV	10
		00000004	DE_ERR_XFER_KEY	10
		00000005	DE_ERR_REDUN_MEM	10
		00000006	DE_ERR_ENERGY_OUT_OF_BOUND	10
		00000007	DE_ERR_HP_ENG_SELECT	10
		00000008	DE_ERR_INVALID_ENERGY	10
		00000009	DE_ERR_CAL_CRC	10
		0000000a	DE_ERR_UKWN_STATE	10
		0000000b	DE_ERR_CHG_TIME	10
		0000000c	DE_ERR_CHG_ENABLE	10
		0000000d	DE_ERR_DUMP_ENERGY	10

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
		0000000e	DE_ERR_RCV	10
		0000000f	DE_ERR_BUF_OUT	10
		00000010	DE_ERR_IGNORE_CHARGE	10
		00000011	DE_ERR_ENERGY_NOT_ZERO	10
		00000012	DE_ERR_TEST_XFER_ENABLE	10
		00000013	DE_ERR_TEST_XFER_ENGAGE	10
		00000014	DE_ERR_TEST_DUMP_RELAY	10
		00000015	DE_ERR_TEST_ADC	10
		00000016	DE_ERR_TEST_DAC	10
		00000017	DE_ERR_TEST_HARDWARE	10
		00000018	DE_ERR_TEST_RAM	10
		00000019	DE_ERR_TEST_ROM	10
		0000001a	DE_ERR_TEST_CPU	10
		0000001b	DE_ERR_TEST_STACK	10
		0000001c	DE_ERR_UNKNOWN_COMMAND	10
		0000001d	DE_ERR_XFER_TIMEOUT	10
		0000001e	DE_ERR_BUTTONS_UP	10
		0000001f	DE_ERR_SYNC_INTERRUPT	10
		00000020	DE_ERR_SELF_TEST_INCOMPLETE	10
		00000021	DE_ERR_MESSAGE_ABORTED	10
		00000022	DE_ERR_MESSAGE_CHECKSUM	10

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
		00000023	DE_ERR_CAL_RCV_CRC	10
		00000024	DE_ERR_CAL_NVM_CRC	10
		00000025	DE_ERR_DAC_WRITE	10
		00000026	DE_ERR_ADC_READ	10
		00000027	DE_ERR_TEST_MODE	10
		00000028	DE_ERR_TEST_COMMAND	10
		00000029	DE_ERR_XFER_CABLE	10
		0000002a	DE_ERR_XFER_PADDLE	10
		0000002b	DE_ERR_BACKGROUND_IDLE	10
		0000002c	DE_ERR_CHG_INHIBIT	10
		0000002d	DE_ERR_CHG_ENABLE_FAIL	10
		0000002e	DE_ERR_BTE_FAULT	25, 27
		0000002f	DE_ERR_BTE_FAULT_CLEARED	25, 27
		00000030	DE_ERR_BTE_RESET	25
		00000031	DE_ERR_NO_BTE_HW	26
		00000032	DE_ERR_NO_BTE_XFER	25, 27
		00000033	DE_ERR_BTE_CEDR_DRV_HI	25, 27
a018	TH_ERROR_PACER	00000001	PA_ERR_LONG_WDT	15
		00000002	PA_ERR_SHORT_WDT	15
		00000003	PA_ERR_SCI_RCV	15
		00000004	PA_ERR_2MS_OVERRUN	15

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
		00000005	PA_ERR_TICK_OVERRUN	15
		00000006	PA_ERR_MSG_CHKSUM	15
		00000007	PA_ERR_MSG_ID	15
		00000008	PA_ERR_MSG_RESYNC	15
		00000009	PA_ERR_MSG_SIZE	15
		0000000a	PA_ERR_SEQUENCING	15
		0000000b	PA_ERR_UNKNOWN_RATE	15
		0000000c	PA_ERR_UNKNOWN_CURRENT	15
		0000000d	PA_ERR_PACE_OVERRUN	15
		0000000e	PA_ERR_PULSE_WIDTH	15
		0000000f	PA_ERR_A2D_INT	15
		00000010	PA_ERR_A2D_EXT	15
		00000011	PA_ERR_SPI	15
		00000012	PA_ERR_RAM_TEST	15
		00000013	PA_ERR_ROM_TEST	15
		00000014	PA_ERR_CPU_TEST	15
		00000015	PA_ERR_STACK_CHECK	15
		00000016	PA_ERR_V_ISO_MON	15
		00000017	PA_ERR_V_12V_MON	15
		00000018	PA_ERR_V_HVIS_SENSE	15
		00000019	PA_ERR_V_HVIS	15

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
		0000001a	PA_ERR_CAL_CURRENT	15
		0000001b	PA_ERR_CAL_Z_300	15
		0000001c	PA_ERR_CAL_CURRENT_CRC	15
		0000001d	PA_ERR_CAL_IMPEDANCE_CRC	15
		0000001e	PA_ERR_CAL_Z_0	15
		0000001f	PA_ERR_PACE_I	15
		00000020	PA_ERR_NO_HVIS_SENSE	15
		00000021	PA_ERR_EXT_A2D_TEST	15
		00000022	PA_ERR_NO_CAL_HVIS_SENSE	15
		00000023	PA_ERR_NO_Q4_SENSE	15, 16
		00000024	PA_ERR_Q4_SENSE	15, 16
a019	TH_ERROR_XFER_HOLD_TEST			6, 1
a01a	TH_ERROR_PACER_FAULT			6, 1
a01b	TH_ERROR_DEFIB_WDT_DISABLE_FAIL			6, 1
a01c	TH_ERROR_UNKWN_ADC_READ_REQUEST			6, 1
a01d	TH_ERROR_UNKWN_DEFIB_STATE			6, 1
a01e	TH_ERROR_UNKWN_ERR_ACTION			6, 1
a01f	TH_ERROR_UNKWN_TEST_RESULT			6, 1
a020	TH_ERROR_PACER_DISABLE			6, 1
a021	TH_ERROR_CAP_CHARGE_FAIL			6, 1
a022	TH_ERROR_CORRUPT_ENERGY_SELECT			6

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
a023	TH_ERROR_XFER_ENABLE_ON			6, 1
a024	TH_ERROR_VCAP2_SATURATED			6, 1
a025	TH_ERROR_CORRUPT_PACER_STAT			15
a026	TH_ERROR_ENERGY_RESIDUE			6, 1
a027	TH_ERROR_PA_RATE_CORRUPT			15
a028	TH_ERROR_CAL_ENERGY_FAIL			6, 1
a029	TH_ERROR_BTE_FAIL			17, 1
a02a	TH_ERROR_BTE_UNKWN_ENERGY			17, 1
a02b	TH_ERROR_DEFIB_CONFIG			28
a02c	TH_ERROR_DUMP_LINE_FAIL			19
b001	PR_ERROR_TEMP_TOO_LOW			13, 28
b002	PR_ERROR_TEMP_TOO_HIGH			13, 28
b003	PR_ERROR_SELF_TEST_FAIL			13, 28
b004	PR_ERROR_WRONG_PRINTER_TYPE			13, 28
b005	PR_ERROR_FALLING_BEHIND			13, 28
b006	PR_ERROR_WAITING_FOR_DATA			13, 28
b007	PR_ERROR_INVALID_ANNOTATION_STATE			13, 28
b008	PR_ERROR_INVALID_LEAD_TO_STATUS			13, 28
b009	PR_ERROR_INVALID_ALARM_EVENT			13, 28
b00a	PR_ERROR_INVALID_PACER_EVENT_TYPE			13, 28
b00b	PR_ERROR_INVALID_STROBE_STATE			13, 28

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
b00c	PR_ERROR_INVALID_EVENT			13, 28
b00d	PR_ERROR_INVALID_L12_LEAD			13, 28
b00e	PR_ERROR_INVALID_GAIN			13, 28
be00	PRFAX_ERROR_RING_BUFFER_CREATE			13, 28
be01	PRFAX_ERROR_ACCESS_RING_BUFFER			13, 28
be02	PRFAX_ERROR_4DEBUG			13, 28
c001	PM_ERROR_MSGQ_ERROR			2, 1
c002	PM_ERROR_NO_RESPONSE			7, 1
c003	PM_ERROR_MSG_UNKNOWN			7, 2, 1
c004	PM_ERROR_BAD_CHECKSUM			7, 2, 1
c005	PM_ERROR_MSG_SIZE			7, 2, 1
c006	PM_ERROR_POWER_PCB_FAULT			7
d001	SC_ERROR_DRIVER_INSTALL			2, 1
d002	SC_ERROR_DEVICE_CREATE			2, 1
d003	SC_ERROR_SCI_FRAME			1
d004	SC_ERROR_SCI_PARITY			1
d005	SC_ERROR_READ_FULL			2, 1
d006	SC_ERROR_SCI_INITIALIZE			2, 1
d007	SC_ERROR_DEVICE_NOT_SUPPORTED			2, 1
d008	SC_ERROR_COULD_NOT_OPEN			2, 1
d009	SC_ERROR_SCI_FIOSETOPTIONS			2, 1

Error Code Table

Error	Error Description	Extension	Extension Description	Corrective Action Code
d00a	SC_ERROR_MSG_SIZE			2, 1
d00b	SC_ERROR_SCI_WRITE			2, 1
d00c	SC_ERROR_SELECT			2, 1
d00d	SC_ERROR_SCI_MSGQ_ERROR			2, 1
d00e	SC_ERROR_MSGQ_NOT_CREATED			2, 1
d00f	SC_ERROR_RX_SEM_NOT_CREATED			2, 1
d010	SC_ERROR_IOCTL_FAILED			2, 1
d011	SC_ERROR_PADDLES_MSG_CKSUM			6, 2, 1
d012	SC_ERROR_PADDLES_MSG_SIZE			6, 2, 1
d013	SC_ERROR_PADDLES_MSG_ID			6, 2, 1

Corrective Action Codes

Corrective action codes are referenced in the **Error Code Table**. If more than one action is listed under Description, perform the first action. If unsuccessful, perform the second action. For example, for Corrective Action Code 2, clear the Data Management Memory first, then replace the A02 Memory PCB.

Corrective Action Code	Description
1	System Communications or System Processing Error: a. Possible transient (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A01 System PCB**.
2	Memory Error: a. Possible transient; **Clear Error**, conduct **PIP**. b. **Clear the Data Management Memory**, conduct **PIP**. c. **Replace A02 Memory PCB**.
3	System Overload: Reduce number of simultaneous operations (for example, transmitting, printing, setting options, all simultaneously).

Corrective Action Codes

Corrective Action Code	Description
4	System Error: Cease unusual activity (for example, pressing keypad controls in rapid succession or in multiple combinations).
5	Test Interface Error: Improper action or keyboard entry.
6	Therapy Processor Error: a. Possible transient (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A04 Therapy PCB**.
7	Power Processor Error: a. Possible transient (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A03 Power PCB**.

Corrective Action Codes

Corrective Action Code	Description
8	Nonvolatile RAM on A01 System PCB lost Coin Battery power: Review **Verifying Device Configuration Data**.
9	Additional error extension (adds on to previous error).
10	Defibrillator out of calibration: a. Complete the **TCP – Defibrillator Self Calibration** procedure, conduct **PIP**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A04 Therapy PCB** or **Replace A22 Biphasic PCB /A14 Inductive Resistor (Biphasic Devices Only)**
11	Keypad Error: a. Possible transient (**Clear Error**, conduct **PIP**). b. Replace indicated **A09 Small Keypad** or **A10 Large Keypad**. c. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.

Corrective Action Codes

Corrective Action Code	Description
12	SpO2 Error: a. Possible transient (**Clear Error**, conduct **PIP**). b. **Replace A16 SpO2 Module**. c. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. d. **Replace A06 OEM PCB**.
13	Printer Error: a. Possible transient (**Clear Error**, conduct **PIP**). b. Incorrect A12 Printer Assembly is installed (e.g., 100 mm instead of 50 mm). c. **Replace A12 Printer Assembly**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
14	Defibrillation Capacitor Error: a. Possible transient (**Clear Error**, conduct **PIP**). b. **Replace A15 Energy Storage Capacitor**.

Corrective Action Codes

Corrective Action Code	Description
15	Pacer out of calibration: a. Complete the **TCP – Pacing Self Calibration** procedure, conduct **PIP**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A04 Therapy PCB**.
16	Pacer output circuit damaged: a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A04 Therapy PCB**.
17	BTE fault or unknown energy: a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A22 Biphasic PCB** or **Replace A04 Therapy PCB**.

Corrective Action Codes

Corrective Action Code	Description
18	Defibrillator configuration error: a. **Replace A04 Therapy PCB** or **Replace A22 Biphasic PCB** or **Replace A01 System PCB**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
19	Dump error code (a02c): a. **Replace A04 Therapy PCB** or **Replace A22 Biphasic PCB** or **Replace A01 System PCB**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
20	ECG error: a. Complete the **TCP – ECG Calibration** procedure, conduct **PIP**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A01 System PCB**.

Corrective Action Codes

Corrective Action Code	Description
21	**Replace A01 System PCB** or **Replace A02 Memory PCB**.
22	NIBP system error: a. Possible transient (**Clear Error**, conduct **PIP**). b. Possible loose cable (Check cable between A21 NIBP module and A06 OEM PCB). c. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. **Replace A21 NIBP Module**. d. **Replace A06 OEM PCB**. e. **Replace A01 System PCB**.

Corrective Action Codes

Corrective Action Code	Description
23	CO2 system error: a. Possible transient (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. **Replace A23 EtCO2 Module**. c. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. **Replace A06 OEM PCB**. d. **Replace A01 System PCB**.
24	a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A01 System PCB**.
25	a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A22 Biphasic PCB**.

Corrective Action Codes

Corrective Action Code	Description
26	Therapy hardware/software mismatch: a. Check the software version of your defibrillator/monitor. Press the ON button to turn device power off, then press the ON button again, and note the software version displayed on the copyright screen. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A04 Therapy PCB**.
27	a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A04 Therapy PCB**.
28	System Software replacement may be necessary, contact **Medtronic Physio-Control Field Service.**

Corrective Action Codes

Corrective Action Code	Description
29	Possible transient caused by use of LIFEPAK 12 defibrillator/monitor in conjunction with an electrosurgical device: a. Disconnect the defibrillator/monitor from line power. b. Investigate power system grounding. c. Call Medtronic Physio-Control Technical Support.
30	Possible therapy processor reset condition. a. If operating the LIFEPAK 12 defibrillator/monitor with an AC power adapter, wait 2 seconds after disconnecting from line power before turning the defibrillator/monitor on.
31	Clear Data Management memory
32	Replace PCMCIA modem card
33	a. Replace SpO2 sensor: Check SpO2 connector for integrity b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
34	Check NIBP calibration
35	Perform CO2 calibration

About the SERVICE Indicator

What the SERVICE indicator does

The SERVICE indicator lights when an error code is written to the Error Code Log. Always examine such instances using **Processing Error Codes**.

What the SERVICE indicator does not do

The SERVICE indicator is not used to indicate the presence of errors in the Error Code Log, rather it is used to indicate when errors are written to the Error Code Log. For example, if you turn on the device, the SERVICE indicator lights. Next you cycle the device power off/on, and this time the SERVICE indicator does not light, but it does not mean that there are no error codes in the Error Code Log. You still need to review the Error Code Log and resolve what was written there in the first instance.

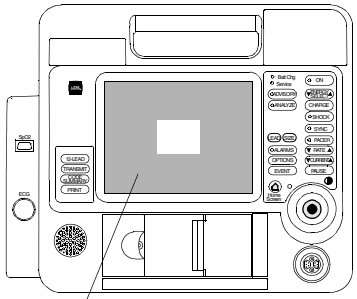
About the Device User Test

When you turn on the device, a series of self-tests occur. If errors are detected, the SERVICE indicator lights. (See **About the SERVICE Indicator**.) Self-testing is not just at power-up, rather, it is continuous, repeating over and over again while the device is on. When you use the Selector to navigate to OPTIONS/USER TEST, the device waits until the next self-test cycle is complete and then reports USER TEST PASSES. Note that selecting OPTIONS/USER TEST does not initiate a self-test cycle; rather, it monitors self-test status and makes reports.

One operation is specific to the OPTIONS/USER TEST feature. This operation consists of one cycle of charging the defibrillation capacitor to 10 J and then dumping the charge. If this operation does not pass, the SERVICE indicator lights and an error is written to the Error Code Log. (See **Processing Error Codes**.)

If the LIFEPAK 12 defibrillator/monitor is used with an AC power adapter, it is recommended that operators of the device should wait 2 seconds after disconnecting from AC line power before powering up the defibrillator/monitor and starting the User Test. This interval gives the device time to complete the transition from the AC power adapter to battery power prior to power up.

Contrast Test—LCD Only



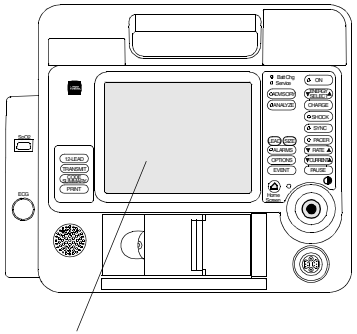
To test screen contrast:

1. Enter **Service Mode**.
2. Using the Selector, navigate to SERVICE/TESTS/CONTRAST. The LCD changes to display a square block in the center of the screen.
3. Rotate the Selector. The background changes from pure white to pure black.
4. Select the desired contrast, then press the Selector to exit.
   The SERVICE/TESTS overlay appears.

Note: If you accidentally select a pure white or pure black background when exiting the contrast test, press the contrast key ◐, rotate the Selector to the desired display, and press the Selector.

5. Turn off the device or navigate to other service topics, as required.

Pixels Test

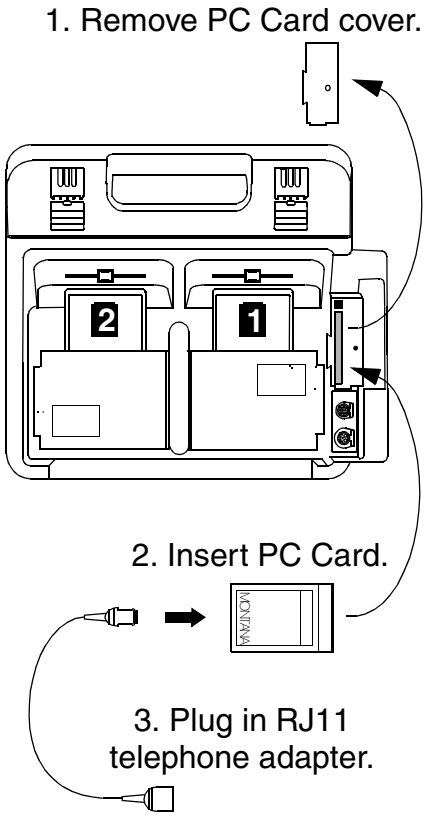


Pixels Display

To test the display pixels:

1. Enter **Service Mode**.
2. Using the Selector, navigate to SERVICE/TESTS/PIXELS. The display changes to display a uniformly lighted screen of medium contrast.
3. Carefully examine the screen for any anomalies. After 5 seconds, the message PRESS SELECTOR KNOB TO EXIT appears.
4. Press the Selector. The SERVICE/TESTS overlay appears.
5. Turn off the device or navigate to other service topics, as desired.

PC Card Test



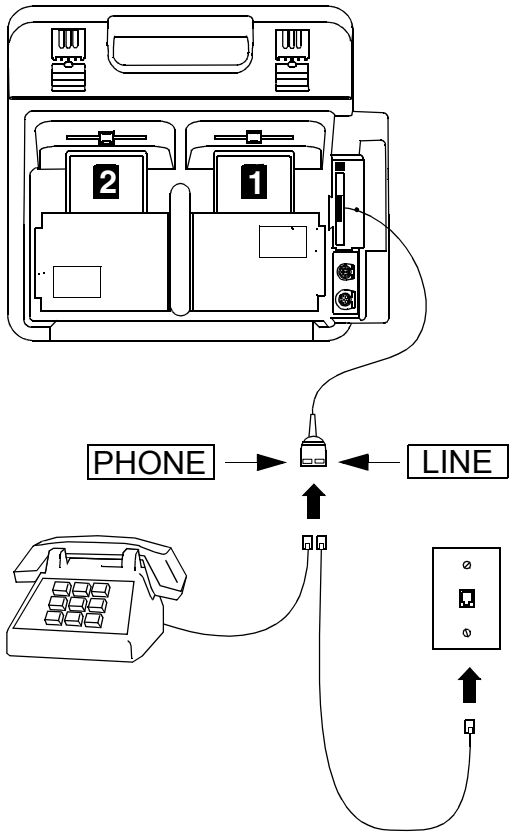
This test checks the ability of the internal PC Card to connect with a remote landline modem. To run this test, you need a telephone number that is answered either by a data modem or by a fax modem. Data modems are associated with a bulletin board service (BBS) or a logon service such as those used by an Internet Service Provider (ISP); fax modems are associated with facsimile machines, which are common to business and personal environments.

Note: This procedure assumes you are using the suggested 3Com® 3CXM556 modem PC Card, Medtronic Physio Control PN 3010294-004. If you use any other modem, you will have to determine the correct AT Command initialization strings.

To install the PC Card and RJ11 telephone adapter:

1. With the device unpowered, remove the Phillips-head screw securing PC Card cover. Remove the cover by sliding it back and away from the device.
2. Place the PC Card, with the manufacturer's name facing outward and the large connector inward, into the LP12 PC Card slot, and push it into place.
3. Thread the RJ11 telephone cable through the PC card cover and snap it into the x-jack RJ11 connector.

PC Card Test



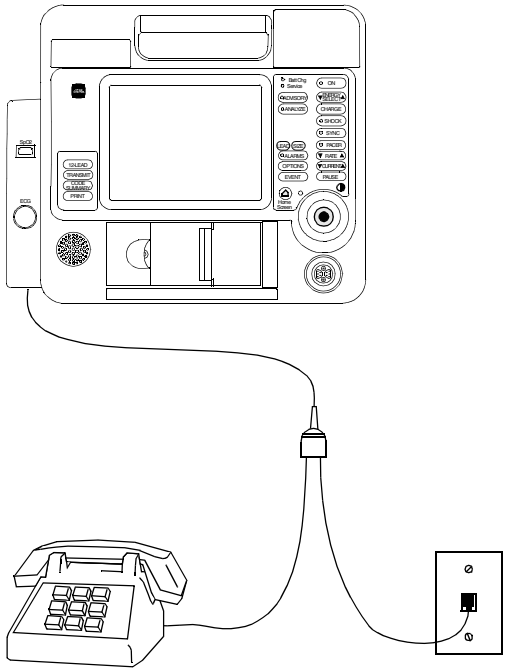
These steps connect the device/PC Card to the landline telephone system.

Note: You must connect to an analog telephone outlet, the type used for fax machines and PC modems. Digital telephone outlets found often in large office settings, hotels, and so on will not work.

To connect the device/PC Card to the telephone system:

1. Unplug the telephone and reconnect it to the RJ11 telephone adapter jack labeled PHONE.
2. Connect one end of a standard telephone cable to the RJ11 telephone adapter x-jack and other end to the telephone outlet.

PC Card Test



To communicate between the device and a remote data modem or fax modem:

1. Hold down the OPTIONS and EVENT keys and apply power. Hold until the PASSCODE overlay appears. Enter the SETUP Mode passcode **5433**.
2. **Data Modem** Rotate the Selector to TRANSMISSION and press. Use the Selector to navigate to: PORTS, INTERNAL, EDIT STRING 1. Ensure that the init string fields are blank. Press HOME SCREEN.

   Fax Modem Rotate the Selector to TRANSMISSION and press. Use the Selector to navigate to: PORTS, INTERNAL FAX, EDIT STRING 1. Ensure that the init string fields are blank. Press HOME SCREEN.
3. Rotate the Selector to TRANSMISSION and press. Use the Selector to navigate to: SITES, SITE 10 (or any unconfigured site). Enter the PHONE # for the remote modem. For example, enter: 9,14258674861 to dial 9 then pause 2 seconds, then dial the telephone number 1(425) 867-4861. Do not use PREFIX 1 or PREFIX 2. Continue to the next step with this overlay in the display.
4. **Data Modem** Rotate the Selector to OUTPUT PORT and press. Use the Selector to navigate to: INTERNAL. Continue to the next step.

   Fax Modem Rotate the Selector to OUTPUT PORT and press. Use the Selector to navigate to: INTERNAL FAX.

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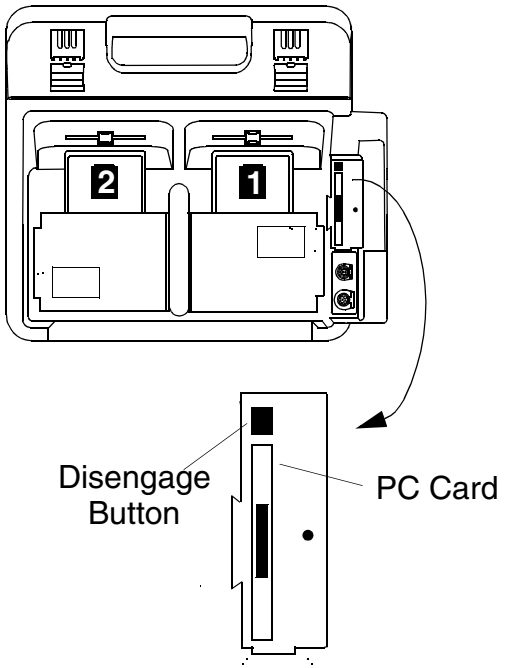
PC Card Test



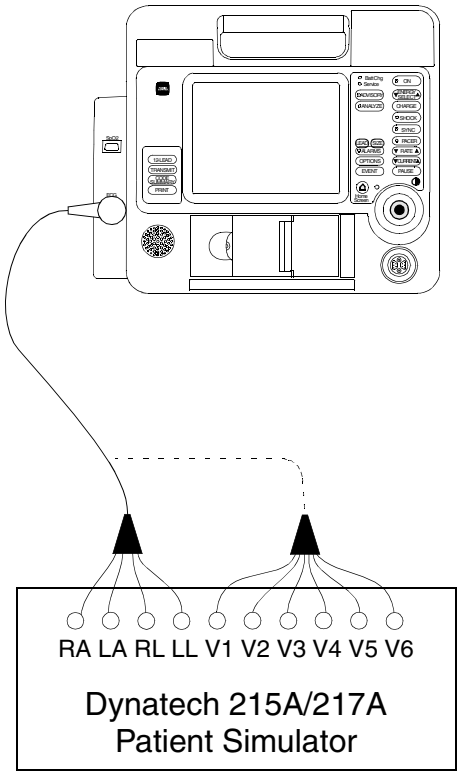
Removing the PC Card

5. Select TEST. The AT Command text appears, and after connection the text +++ (hang-up) appears, indicating a successful test.

To remove the PC Card from the device:

1. Turn off the LIFEPAK 12 defibrillator/monitor.
2. Remove the RJ11 telephone cable from the PC Card.
3. Push the disengage button just above the PC Card to push the card free of the connector. Remove the PC Card.
4. Reinstall the PC Card cover.
5. Turn off the device or navigate to other service topics, as required.

12-Lead/3-Lead ECG Fast Restore Test



To test 12-Lead/3-Lead ECG fast restore:

1. Reconfigure the test setup (left) by removing the Standard Paddles and connecting an ECG Main Cable to the ECG connector.
2. Connect both the Limb Lead attachment and Precordial attachments to the ECG Main Cable, and connect their corresponding leads to the Dynatech 215A/217A Patient Simulator terminals.
3. Fashion the **Fast Restore Test Fixture** for this test.
4. Turn off the Dynatech 215A/217A Patient Simulator. (No power is applied to the simulator for this test.)
5. Insert a tinned test wire about 12 inches long under terminal posts LA, RA, LL, and V1 to V6. (See next page for an illustration.)
6. Connect the test wire LA to the test fixture 350mV terminal and the test wire RA to the test fixture COM terminal.
7. Rotate the Selector to highlight the Channel 1 (top of the screen) ECG waveform area, then press the Selector. The CHANNEL 1 overlay appears.
8. Using the Selector, select I for the LEAD, 0.25 for the SIZE, then press the HOME SCREEN key.

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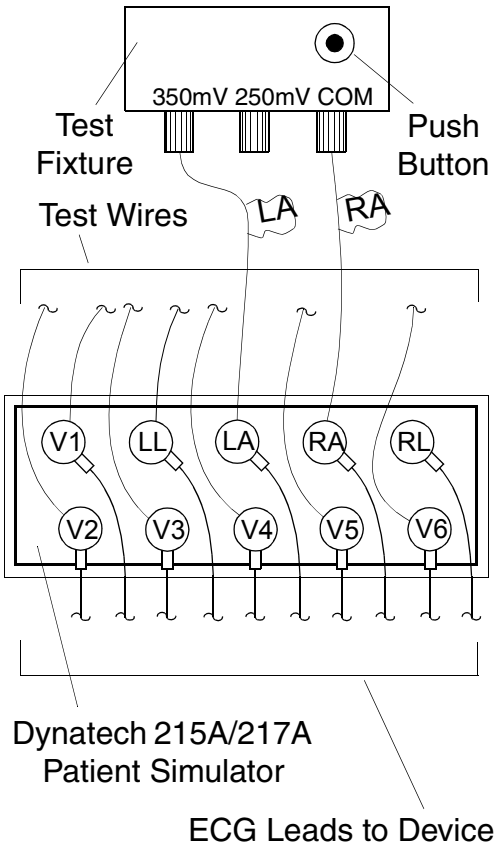
12-Lead/3-Lead ECG Fast Restore Test



9. Press the OPTIONS key. Using the Selector, select PRINTER, then DIAGNOSTIC for the MODE. Press the HOME SCREEN key.
10. Press the PRINT key. A printout of ECG Lead I appears (flat line).
11. Press the test fixture pushbutton for 5 seconds, then release. The dc step functions appear on the screen and print out. Press the PRINT key to stop printing.
12. Confirm that the fast restore time between the start of the dc step function and the return to the flat line is 0.5 seconds (12.5 mm) or less.
13. Move the test wire LA to the test fixture 250 mV terminal.
14. Rotate the Selector to highlight Channel 1 (top of the screen).
15. Using the Selector, select II for the LEAD, then press the PRINT key.
16. Press the test fixture pushbutton for 5 seconds, then release. The dc step functions appear on the printout. Press the PRINT key to stop printing.
17. Confirm that the fast restore time is 0.5 seconds (12.5 mm) or less (next page).
18. Connect the test wires LL, LA, and RA to the test fixture COM terminal. Connect the test wire V1 to the test fixture 250 mV terminal.

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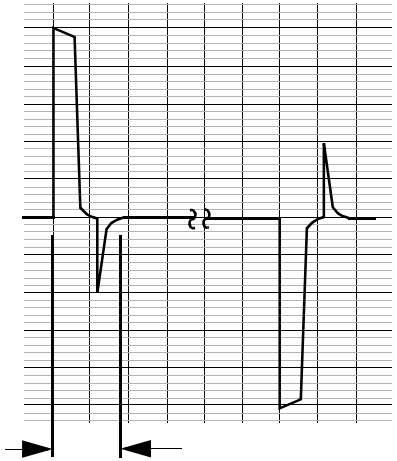
12-Lead/3-Lead ECG Fast Restore Test

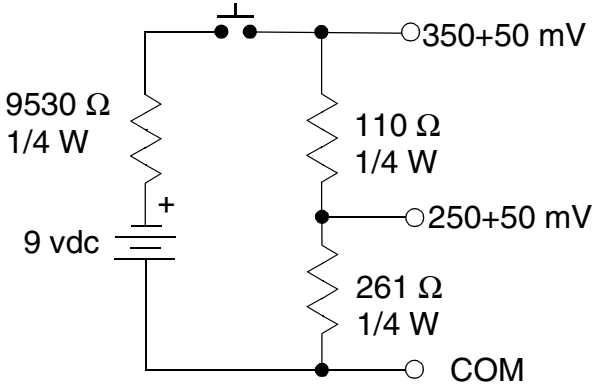


<0.5 sec. (12.5 mm)

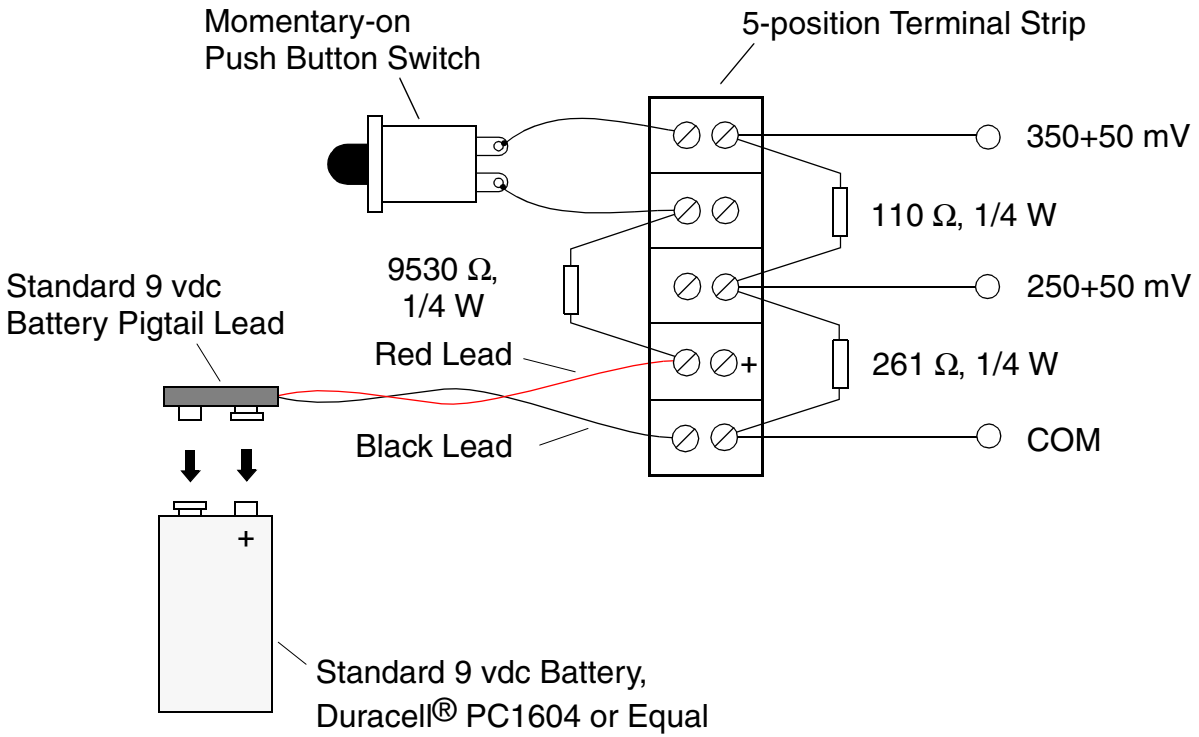
19. Rotate the Selector to highlight Channel 1 (top of the screen).
20. Using the Selector, select V1 for the LEAD, then press the PRINT key.
21. As before, press/release the test fixture pushbutton, stop printing, and confirm that the fast restore time is 0.5 seconds (12.5 mm) or less.
22. Repeat Steps 18 through 21 for leads V2, V3, V4, V5, and V6.
23. Disconnect the test wires from the Dynatech 215A/217A Patient Simulator and the ECG cable from the device.
24. Turn off the device or navigate to other service topics, as required.

Fast Restore Test Fixture

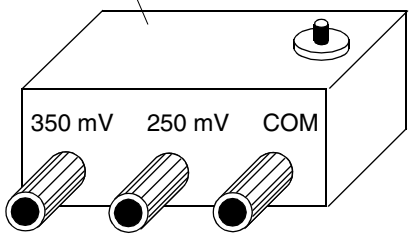
The Fast Restore Test Fixture is used in the **12-Lead/3-Lead ECG Fast Restore Test**. The purpose of the fixture is to inject a dc voltage of 250 mV or 350 mV into test combinations of the ECG 12-lead terminals.



Schematic Diagram



Packaging Suggestion



Preventive Maintenance

Periodic maintenance, inspection, and testing of the LIFEPAK 12 defibrillator/monitor helps prevent and detect possible electrical and mechanical problems. When scheduled maintenance is due for the device, a screen message MAINTENANCE DUE is displayed for 10 minutes each time the device is turned on. Use the **Setting the Maintenance Prompt Interval** and **Resetting the Maintenance Prompt Interval** procedures to set a new interval or to reset the maintenance interval.

For information about battery charging, conditioning, and battery-related topics, see **Battery Maintenance**. The information in this section includes the following:

Setting the Maintenance Prompt Interval
Resetting the Maintenance Prompt Interval
Preventive Maintenance and Testing Schedule
Scheduled Replacement Items
Device Useful Life
Device Support Policy
Cleaning
Storage
A12 Printer (50 mm) Maintenance
A12 Printer (100 mm) Maintenance

Setting the Maintenance Prompt Interval

You can set up the device to display the screen message MAINTENANCE DUE for a selected interval. When this interval times out, the message appears continuously for 10 minutes each time the device is turned on. The factory default maintenance prompt interval is 12 months. This procedure is used for changing the maintenance prompt interval only.

To clear the MAINTENANCE DUE message, complete the **Resetting the Maintenance Prompt Interval** procedure.

To change the scheduled maintenance interval:

1. Enter **Service Mode**.
2. From the SERVICE Menu, select MAINT PROMPT to display the SERVICE/MAINT PROMPT Menu, including the NEXT PROMPT date for scheduled maintenance.
3. Select INTERVAL. The interval choices of OFF, 3 MONTHS, 6 MONTHS, and 12 MONTHS appear.
4. Select the desired interval.
5. Turn off the device.

Resetting the Maintenance Prompt Interval

After completing scheduled maintenance, reset the maintenance prompt interval counter to clear the MAINTENANCE DUE message and begin the count for the next scheduled maintenance.

To reset the scheduled maintenance interval:

1. Enter **Service Mode**.
2. From the SERVICE Menu, select MAINT PROMPT to display the SERVICE/MAINT PROMPT Menu, including the NEXT PROMPT date for scheduled maintenance.
3. Select RESET. The NEXT PROMPT date is revised to the new scheduled maintenance date.
4. Turn off the device.

Preventive Maintenance and Testing Schedule

Introduction

Periodic maintenance, inspection, and testing of the device will help prevent possible electrical and mechanical problems. Refer to the LIFEPAK 12 defibrillator/monitor series **Operating Instructions – Operator Checklist** for additional items.

Guidelines

The following table shows the schedule for preventive maintenance activities. For items that should be replaced at regular intervals, see **Scheduled Replacement Items**.

Activity	As Needed	12 Months
Performance Inspection Procedures (PIP)	•	•
Test and Calibration Procedures (TCP)	•	
Exterior Physical Inspection	•	•
Interior Physical Inspection	•	
Exterior Cleaning	•	•
Interior Cleaning	•	

Scheduled Replacement Items

Introduction

There are several items that should be replaced at regular intervals because of their definite life span.

The **Battery Pin Replacement** procedure assures that the batteries continue to make good connection with the device.

The **Coin Battery Replacement** procedure assures that the device will not lose battery power for the real-time clock and the 32kx8 NVRAM, which stores the device counters, manufacturing codes, calibration data, user setup configuration and other related device parameters. When you remove the old coin battery, you have up to 2 minutes to insert the new coin battery without losing data.

Replace the 3-Lead ECG and 12-Lead ECG cables every 2 years to assure the continued performance of these items.

Replacement Items

The following table shows the schedule for replacement items.

Replacement Item	Frequency
Replace Battery Pins	2 years
Replace ECG Cable	2 years
Replace Coin (Clock) Battery	5 years

Device Useful Life

During product development, the LIFEPAK 12 defibrillator/monitor and subassemblies are subjected to rigorous life testing. This testing and the routine testing and maintenance program recommended in this Service Manual will help to provide reliable device operation for many years.

However, both rapid technological changes and the availability of replacement parts limit the useful life of all modern medical devices. The American Hospital Association suggests a 5-year useful life expectancy for defibrillators (*Estimated Useful Lives of Depreciable Hospital Assets, Revised 1993 Edition*). Similarly, the US Army lists an 8-year life expectancy for defibrillators (technical bulletin: *Maintenance Expenditure Limits for Medical Materiel, TB MED 7 Revision 8 October 1993*). Medtronic Physio-Control Corp. recommends that you adopt an 8-year useful life expectancy for this device.

Device Support Policy

Medtronic Physio-Control Corp. provides full technical subassembly-level support and subassembly replacement parts for a period of 8 years from the date of shipment from our manufacturing facility. After this 8-year period, Medtronic Physio-Control provides technical support and subassembly replacement parts as available.

Cleaning

Tools and Materials

The tools and materials that you will need to perform an external and internal cleaning of the LIFEPAK 12 defibrillator/monitor are shown below.

Product	Description
Static discharge protected work area	Grounded conductive surface and wrist strap
Isopropyl alcohol	
Soap and water	
Quaternary ammonium compounds	
Peroxide (peracetic acid) solutions	
Cotton swabs	
Vacuum cleaner	
Soft-bristle brush	Nonmetallic
Cloth	Clean and lint-free
Compressed air	Clean and dry (60 psi, max.)

Cleaning

External Cleaning Procedures

WARNING!

Shock or fire hazard. Do not immerse or soak any portion of this device in water or any other fluid. Avoid spilling any fluid on the device or accessories.

CAUTION!

Possible case damage. Do not clean any part of this device or accessories with bleach, bleach dilution, or phenolic compounds. Do not use abrasive or flammable cleaning agents. Do not attempt to sterilize this device or any accessories unless otherwise specified in accessory Operating Instructions.

Clean the exterior of the LIFEPAK 12 defibrillator/monitor by wiping the surface with any of the following solutions:

- Soap and water
- Quaternary ammonium compounds
- Isopropyl alcohol
- Peroxide (peracetic acid) solutions

Cleaning

Internal Cleaning Procedures

WARNING!

Shock hazard. The Energy Storage Capacitor carries high voltage. Remove the battery and discharge the capacitor before handling.

CAUTION!

Possible case damage. Do not clean any part of this device or accessories with bleach, bleach dilution, or phenolic compounds. Do not use abrasive or flammable cleaning agents. Do not attempt to sterilize this device or any accessories unless otherwise specified in accessory Operating Instructions.

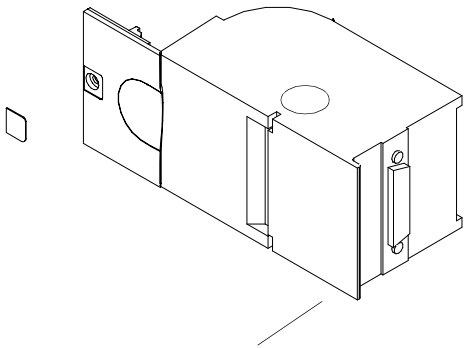
Clean the interior of the LIFEPAK 12 defibrillator/monitor as described below.

1. Brush interior surfaces and parts with a nonmetallic soft-bristle brush.
2. Remove loosened dirt and dust using a dry, low-pressure compressed air (60 psi) or vacuum cleaner.
3. Wipe metal surfaces with a soft, nonabrasive cloth that has been dampened with isopropyl alcohol.

Storage

When the LIFEPAK 12 defibrillator/monitor is not in use, store at temperatures between 0° and +35° C (+32° and +95° F) when batteries are installed, or -20° and +60° C (-4° and +140° F) if no batteries are installed.

A12 Printer (50 mm) Maintenance



A12 Printer (50 mm)

This section provides general maintenance information for the A12 Printer (50 mm). Also refer to the **A12 Printer (50 mm) Assembly Drawing** and the **A12 Printer (50 mm) Parts List** to locate parts specified in these procedures. Only the listed parts are available for replacement. Other parts are shown for reference only.

A12 Printer (50 mm) Maintenance

Printroller Cleaning

To remove paper debris and other residue from the printroller, soak a cotton swab with alcohol and wipe across the roller surface.

Printhead Cleaning

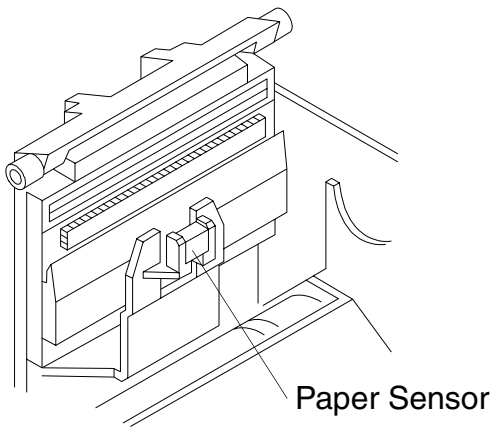
Clean the printhead after using approximately 100 rolls of chart paper or more often if needed. Use a cotton swab soaked in clean isopropyl alcohol.

1. Turn off the device. Locate the printhead between the two brushes on the printer upper half.
2. Wipe the surface of the printhead clean with the alcohol-soaked cotton swab, allowing only the cotton tip of the swab to contact the printhead.

Paper Sensor Cleaning

The paper sensor also requires periodic cleaning to prevent paper debris from blocking the infrared signals that reflect off the paper during normal operation. See below for the location of the paper sensor.

Clean the sensor whenever the printhead is cleaned. Use a clean cotton swab soaked in clean isopropyl alcohol. Gently wipe the surface of the paper sensor with the tip of the swab.



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A12 Printer (50 mm) Maintenance

Printhead Adjustment Procedure

Changes in printhead up/down alignment can cause changes in print image quality. Use the following procedure to adjust the printhead for optimum print quality. Make sure that the power is off before beginning this procedure.

1. Remove the A12 Printer (50 mm). (Refer to the **A12 Printer (50 mm) Assembly Replacement** procedure.)
2. Connect a jumper cable between the A12 Printer and the device, and install a roll of recorder paper in the printer.
3. Turn on the LIFEPAK 12 defibrillator/monitor and conduct the **TCP – Printer Calibration** procedure.
4. Select START, then press the Selector. The printer runs and prints horizontal tick marks. Observe the quality of the printed marks. If the printout is satisfactory, press the Selector and then go to step 9. To adjust the printhead, go to step 5.
5. Turn off the recorder.
6. Open the recorder door and locate the pivot screw on the bottom rear surface.

A12 Printer (50 mm) Maintenance

Printhead Adjustment Procedure (continued)

7. Using a Phillips screw driver, slightly tighten or loosen the pivot screw to adjust the printhead.
8. Close the recorder door and repeat Step 4 to run another test strip to confirm print quality changes. Adjust as required until optimum print quality is achieved.
9. Turn off the defibrillator and reinstall the recorder.

A12 Printer (100 mm) Maintenance

This section provides general maintenance information for the A12 Printer (100 mm). Also refer to the **A12 Printer (100 mm) Parts List** to locate parts specified in these procedures. Only the listed parts are available for replacement.

A12 Printer (100 mm) Maintenance

Printroller Cleaning

To remove paper debris and other residue from the printroller, soak a cotton swab with alcohol and wipe across the roller surface.

Printhead Cleaning

Clean the printhead after using approximately 100 rolls of chart paper or more often if needed. Use a cotton swab soaked in clean isopropyl alcohol.

1. Turn off the device. Locate the printhead between the two brushes on the printer upper half.
2. Wipe the surface of the printhead clean with the alcohol-soaked cotton swab, allowing only the cotton tip of the swab to contact the printhead.

Paper Sensor Cleaning

The paper sensor also requires periodic cleaning to prevent paper debris from blocking the infrared signals that reflect off the paper during normal operation. See below for the location of the paper sensor.

Clean the sensor whenever the printhead is cleaned. Use a clean cotton swab soaked in clean isopropyl alcohol. Gently wipe the surface of the paper sensor with the tip of the swab.

Battery Maintenance

Follow the guidelines described in this section to help maximize battery life and performance.

Battery General Characteristics

Battery Performance Characteristics

Charging Batteries

Conditioning Batteries

Shelf Life Testing Batteries

Discarding/Recycling Batteries

Storing Batteries

Receiving New Batteries

Coin Battery

For information about the Battery Support System 2 (BSS 2), see the **Battery Support System 2 Operating Instructions – Basic Orientation.**

Note: Unless otherwise specified, the information in this section applies to batteries and their maintenance in the Battery Support System 2 (BSS 2). It is beyond of the scope of this manual to describe use of the original Medtronic Physio-Control Battery Support System (or BSS, PN 801807).

Battery General Characteristics

Types of Batteries

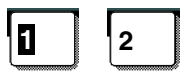
The LIFEPAK 12 defibrillator/monitor can be powered by four types of batteries:

- FASTPAK rechargeable battery
- FASTPAK 2 rechargeable battery with fuel gauge
- LIFEPAK NiCd rechargeable battery
- LIFEPAK SLA (Sealed Lead-Acid) rechargeable battery

You may use any combination of batteries in the device. To compare the batteries by appearance, see the **Battery Outlines** illustration.

Battery Icons

The LIFEPAK 12 defibrillator/monitor displays two battery condition icons: battery available and battery discharged. For example:



Batteries 1 and 2 have available charge, and the device is operating from Battery 1.

Battery 1 has discharged, and the device is now operating from battery 2. A BATTERY 1 LOW message appears.

Batteries 1 and 2 have discharged, and the device has switched back to Battery 1. A REPLACE BATTERY message appears.

When all battery capacity is exhausted, the device turns off. If you insert a fresh battery and repower the device in less than 30 seconds, the device retains its settings. For more information, see **Battery Performance Characteristics**.

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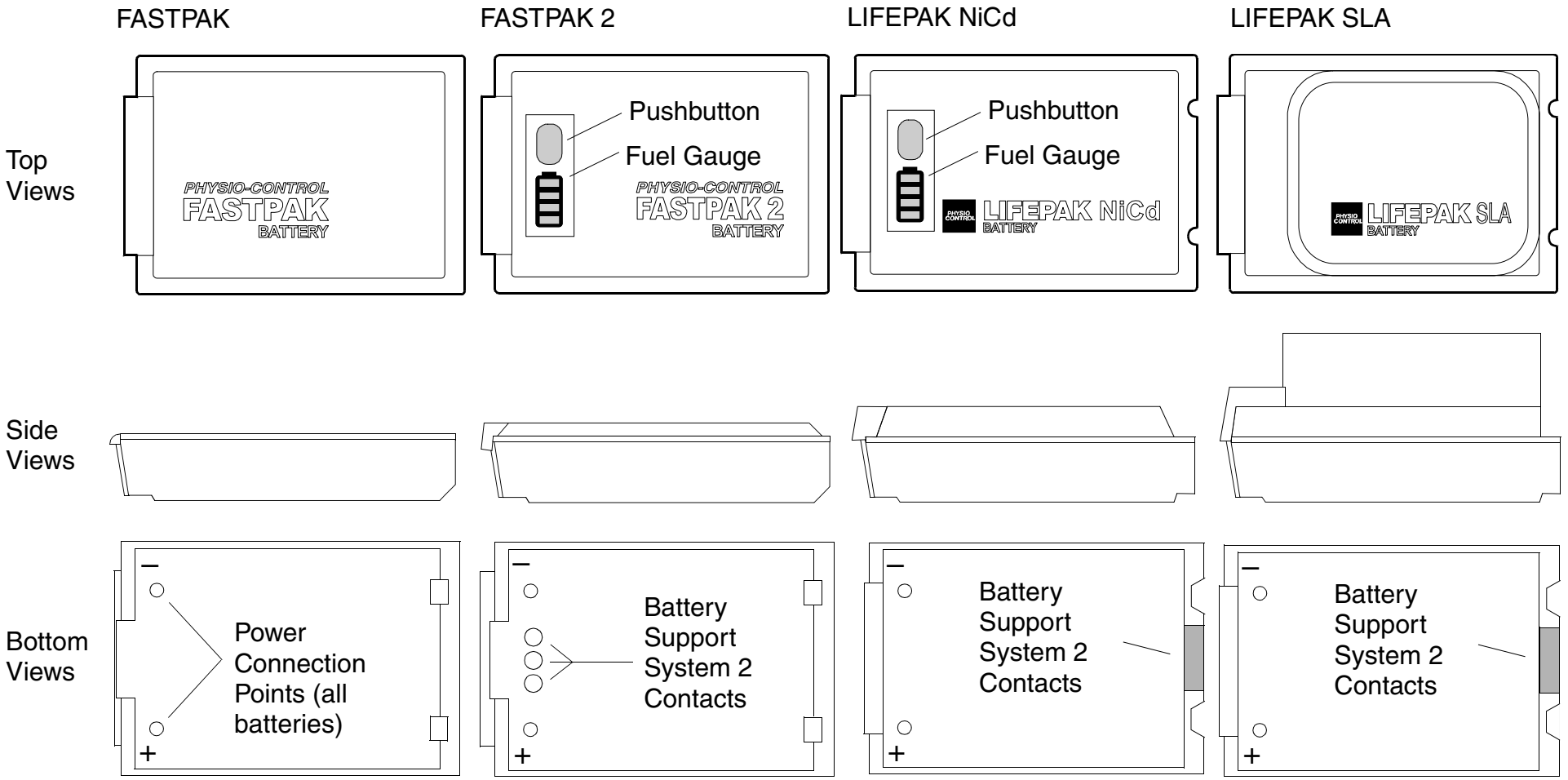
Battery General Characteristics

Battery Outlines



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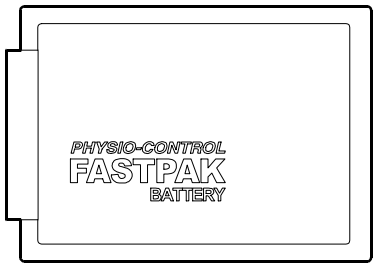
Battery General Characteristics

FASTPAK Battery



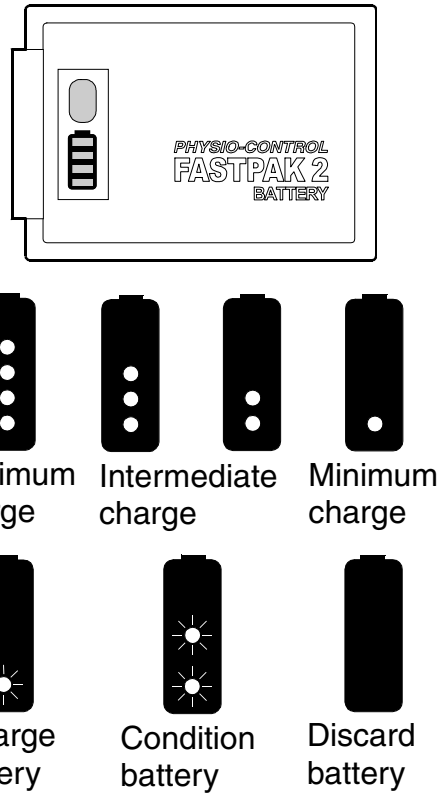
Properly maintained, FASTPAK batteries have a useful life of approximately 2 years. The FASTPAK battery functions identically to the FASTPAK 2 battery and is compatible with the LIFEPAK 5, LIFEPAK 10, and LIFEPAK 11 products. However, the FASTPAK battery has neither a pushbutton fuel gauge nor can it communicate with the BSS 2.

The FASTPAK battery can be charged in a BSS, BSS 2, or the LIFEPAK 12 defibrillator/monitor when the device is powered by an AC or DC Power Adapter.

Note: While it is permissible to charge the FASTPAK battery in the original BSS, it is beyond the scope of this manual to describe this process.

Battery General Characteristics

FASTPAK 2 Battery



The FASTPAK 2 NiCd battery functions identically to the FASTPAK battery and is compatible with the LIFEPAK 5, LIFEPAK 10, and LIFEPAK 11 products. The only differences between the two batteries are that the FASTPAK 2 battery has a pushbutton fuel gauge and the capability to communicate with the BSS 2.

When you press the FASTPAK 2 pushbutton, a series of four green LEDs light in a pattern that indicates the relative battery capacity and battery condition.

- One to four LEDs indicate the relative charge of the battery, with four lights indicating maximum charge.
- One LED flashing: **Charge the battery**.
- Two LEDs flashing alternately: **Condition the battery**.
- No LEDs in display: battery has 0% charge or needs to be discarded.

CAUTION!

Possible inaccurate battery charge indicator. Using the Medtronic Physio-Control Battery Support System (PN 801807) or the two-well Battery Charger (PNs 9-00284, 9-00288, and 801350) to charge and maintain a FASTPAK 2 battery will eventually result in an inaccurate battery charge level indicator. Use only the BSS 2 (PN 3010035) to charge and maintain FASTPAK 2 batteries.

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Battery General Characteristics

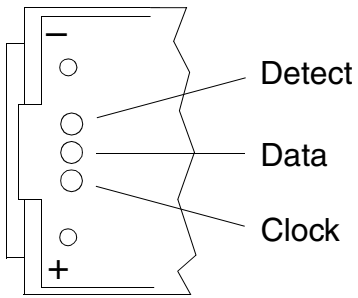
FASTPAK 2 Battery (continued)

Properly maintained, FASTPAK 2 batteries have a useful life of up to 5 years. However, the FASTPAK 2 battery has internal parameters that establish useful life (i.e., the battery may reach end-of-life in less than 5 years). You should **discard/recycle** the FASTPAK 2 battery when it:

- Has been charged/discharged more than 750 times.
- Reaches 5 years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an ampere-hour (ah) characteristic below minimum standards (for example, the rated 1.2 ah value is below 0.9 ah).
- Has discharged to a level of 4.5 vdc, or less.

The FASTPAK 2 battery incorporates internal circuitry for communication with the BSS 2 through connections within the bottom of the battery. The FASTPAK 2 battery communicates through contacts located on the bottom of the battery that allow the exchange of information about battery type, ampere-hour rating, charge rate, target voltage, current, and other parameters.

FASTPAK 2 batteries may be charged and shelf life tested only in the BSS 2. The LIFEPAK 12 defibrillator/monitor, when powered by an external AC Power Adapter or DC Power Adapter, can also charge FASTPAK 2 batteries.



BBS 2 Battery Contacts

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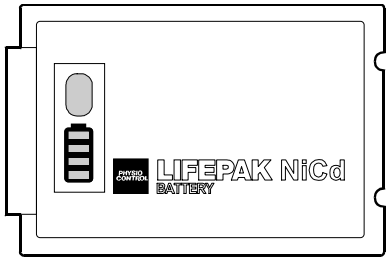
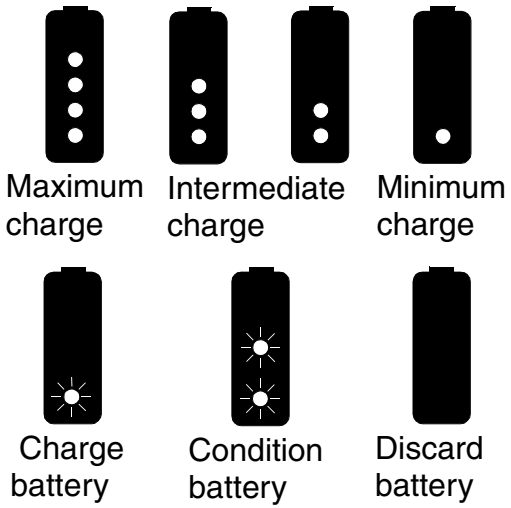
Battery General Characteristics

LIFEPAK NiCd Battery





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The LIFEPAK NiCd battery has a pushbutton fuel gauge and the capability to communicate with the BSS 2.

When you press the LIFEPAK 2 pushbutton, a series of four green LEDs light in a pattern that indicates the relative battery capacity and battery condition.

- One to four LEDs indicate the relative charge of the battery, with four lights indicating maximum charge.
- One LED flashing: **Charge the battery**.
- Two LEDs flashing alternately: **Condition the battery**.
- No LEDs in display: battery has 0% charge or needs to be discarded.

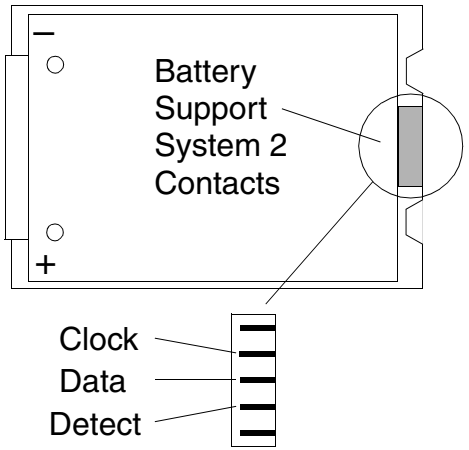
Note: The LIFEPAK NiCd battery is available in 1.7 amp/hour and 2.4 amp/hour versions. The duration of Charge, Condition, and Shelf Life cycles depends upon the capacity of the battery used.

CAUTION!

Possible inaccurate battery charge indicator. Using the Medtronic Physio-Control Battery Support System (PN 801807) or the two-well Battery Charger (PNs 9-00284, 9-00288, and 801350) to charge and maintain a LIFEPAK NiCd battery will eventually result in an inaccurate battery charge level indicator. Use only the BSS 2 (PN 3010035) to charge and maintain LIFEPAK NiCd batteries.

Battery General Characteristics

LIFEPAK NiCd Battery (continued)



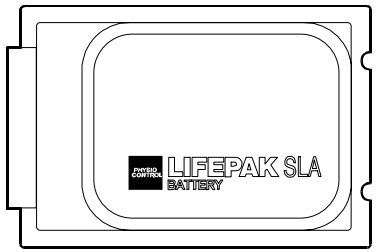
Properly maintained, LIFEPAK NiCd batteries have a useful life of approximately 5 years. However, the LIFEPAK NiCd has internal parameters that establish useful life (i.e., the battery may reach end-of-life in less than 5 years). You should **discard/recycle** the LIFEPAK NiCd battery when it:

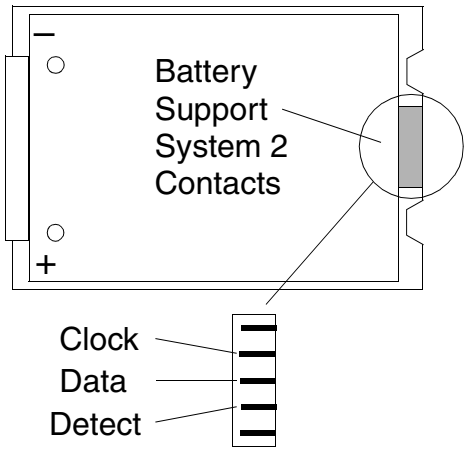
- Has been charged/discharged more than 500 times.
- Reaches 5 years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an ampere-hour (ah) characteristic below minimum standards (for example, the rated 1.7 ah value is below 1.3 ah).
- Has discharged to a level of 4.5 vdc, or less.

The LIFEPAK NiCd battery incorporates internal circuitry for communication with the BSS 2 and the LIFEPAK 12 defibrillator/monitor. The LIFEPAK NiCd battery communicates through contacts in a blade connector located on the bottom of the battery that allow the exchange of information about battery type, ampere-hour rating, charge rate, target voltage, current, and other parameters.

Battery General Characteristics

LIFEPAK SLA Battery





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Properly maintained, LIFEPAK SLA batteries have a useful life of up to 3 years. However, the LIFEPAK SLA battery has internal parameters that establish useful life (i.e., the battery may reach end-of-life in less than 3 years). You should **discard/recycle** the LIFEPAK SLA battery when it:

- Has been charged/discharged more than 100 times.
- Reaches 3 years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an ampere-hour (ah) characteristic below minimum standards (for example, the rated 2.5 ah value is below 1.9 ah).
- Has discharged to a level of 4.5 vdc, or less.

The LIFEPAK SLA battery incorporates internal circuitry for communication with the BSS 2 or with the LIFEPAK 12 defibrillator/monitor. The LIFEPAK SLA battery communicates through contacts in a blade connector located on the bottom of the battery that allow the exchange of information about battery type, ampere-hour rating, charge rate, target voltage, current, and other parameters.

The LIFEPAK SLA battery can be charged by either by the BSS 2 or by the LIFEPAK 12 defibrillator/monitor with the AC Power Adapter or DC Power Adapter. The BSS2 may be used to condition and Shelf Life Test SLA batteries, but SLA batteries, unlike NiCd batteries, do not require periodic conditioning. The LIFEPAK SLA battery will not physically fit in a Battery Support System (PN 801807) or other Medtronic Physio-Control charging system.

Battery Performance Characteristics

NiCd Battery Performance Factors

There are three major factors that affect NiCd battery performance:

- Temperature – Charging batteries at a room temperature of 20°C to 25°C (68°F to 78°F) is preferred to maximize battery performance and life. The extreme temperature range for charging batteries is 5°C to 35°C (41°F to 95°F).

CAUTION!

Possible battery damage. Charging a battery at temperatures below 5°C (41°F) or above 35°C (95°F) will prevent the battery from reaching its full capacity and may lead to irreversible cell damage.

- Voltage Depression – A condition that reduces battery performance. When NiCd batteries repeatedly receive a shallow discharge (that is, not allowed to drain completely between charging cycles) voltage depression occurs. Voltage depression can usually be reversed by conditioning a battery every 3 months.

  Voltage depression is often mistakenly called “Memory.”

- Self-Discharge Rate – Batteries self-discharge when not used. A new NiCd battery self-discharges approximately 1% of its capacity each day when stored at room temperature. In 10 days a new NiCd battery not installed in the defibrillator loses approximately 10% of its capacity.

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Battery Performance Characteristics

NiCd Battery Performance Factors (continued)

Use the Battery Support System 2 to evaluate the self-discharge rate of a FASTPAK battery by performing the **Shelf Life** test.

The actual battery self-discharge rate depends on:

- Battery age
- Temperature
- Frequency of use
- Length of time in storage
- Physical battery condition

These factors can combine to significantly increase the battery discharge rate. For example, an older battery stored in higher temperatures may have an accelerated self-discharge rate much greater than 1% a day.

The self-discharge rate increases as the battery ages.

The typical charge time for fully depleted FASTPAK and FASTPAK 2 batteries in the BSS 2 is 1.5 hours, or less. New FASTPAK and FASTPAK 2 batteries undergo a forming process that may extend charge time for a fully depleted battery beyond 1.5 hours for the first 10 charge cycles.

Battery Performance Characteristics

SLA Battery Performance Factors

There are three major factors that affect SLA battery performance:

- Storage – Storing an SLA battery that is less than 100% charged can result in permanent damage.
- Undercharging – Fully charge SLA batteries between uses.

  If SLA batteries are not 100% recharged between uses, sulfation (lead sulfate buildup on electrode surfaces inside the battery) can occur. Sulfation reduces battery capacity and may result in premature battery failure.
- Self-Discharge Rate – SLA batteries have a low self-discharge rate. A new SLA battery self-discharges approximately 0.1% of its capacity each day when stored at room temperature. In 10 days a new SLA battery loses approximately 1.0% of its capacity.

  The actual battery self-discharge rate depends on:

  – Battery age
  – Temperature
  – Frequency of use
  – Length of time in storage
  – Physical battery condition

  The self-discharge rate increases as the battery ages.

Battery Performance Characteristics

Battery Performance Comparison

The following table compares the performance characteristics of the FASTPAK, FASTPAK 2, FASTPAK NiCd, and LIFEPAK SLA batteries (at 20°C).

Operating Conditions	Total Operating Duration				Duration After Low Battery Alert			
	Typical		Minimum		Typical		Minimum	
	LCD	EL	LCD	EL	LCD	EL	LCD	EL
Monitoring (minutes)								
FASTPAK/ FASTPAK 2 NiCd	110	81	60	43	10	6	2	1
LIFEPAK NiCd	155	114	85	62	14	8	2	1
LIFEPAK NiCd (2.4 A/H)	220	162	120	86	20	12	4	2
LIFEPAK SLA	180	132	100	73	16	10	2	1
Monitoring/Pacing (minutes at 100 ma, 60 ppm)								
FASTPAK/ FASTPAK 2 NiCd	105	75	60	42	9	6	2	1
LIFEPAK NiCd	145	104	85	60	12	8	2	1
LIFEPAK NiCd (2.4 A/H)	210	150	120	84	18	12	4	2
LIFEPAK SLA	170	122	100	71	14	10	2	1

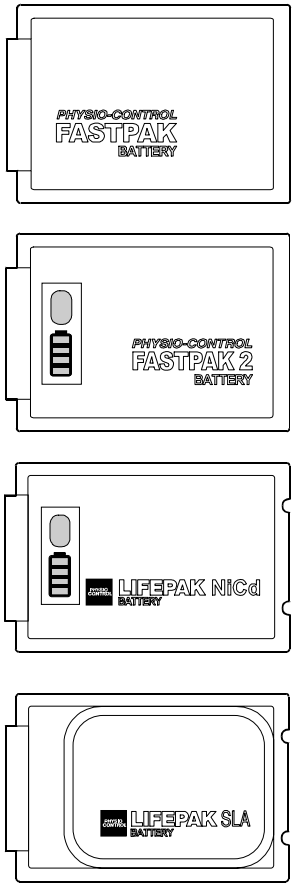
Battery Performance Characteristics

Battery Performance Comparison (continued)

Operating Conditions	Total Operating Duration				Duration After Low Battery Alert			
	Typical		Minimum		Typical		Minimum	
	LCD	EL	LCD	EL	LCD	EL	LCD	EL
Defibrillation (360 J discharges)								
FASTPAK/ FASTPAK 2 NiCd	80	72	45	40	7	7	3	3
LIFEPAK NiCd	110	99	60	54	10	10	3	3
LIFEPAK NiCd (2.4 A/H)	160	144	90	80	14	14	6	6
LIFEPAK SLA	145	131	85	76	12	12	3	3

Charging Batteries

Overview



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WARNING!

Possible loss of power and delay of therapy during patient care. Using an improperly maintained battery to power a defibrillator may cause power failure without warning. Use the appropriate Medtronic Physio-Control Battery Support System to charge and condition batteries.

CAUTION!

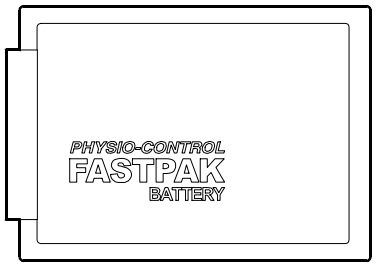
Possible inaccurate battery charge indicator. Using the Medtronic Physio-Control Battery Support System (PN 801807) or the two-well Battery Charger (PNs 9-00284, 9-00288, and 801350) to charge and maintain a FASTPAK 2 battery will eventually result in an inaccurate battery charge level indicator. Use only the BSS 2 (PN 3010035) to charge and maintain FASTPAK 2 batteries.

FASTPAK batteries may be charged, conditioned, and shelf life tested in the BSS or the BSS 2. FASTPAK 2, LIFEPAK NiCd, and LIFEPAK SLA batteries may be charged, conditioned, and shelf life tested in the BSS 2 only. The LIFEPAK 12 defibrillator/monitor, when powered by an AC or DC Power Adapter, can charge batteries.

- **FASTPAK Battery Charging**
- **FASTPAK 2 Battery Charging**
- **LIFEPAK NiCd Battery Charging**
- **LIFEPAK SLA Battery Charging**
- **Battery Charging in the LIFEPAK 12 defibrillator/monitor**

Charging Batteries

FASTPAK Battery Charging



The typical charge time for a fully depleted FASTPAK battery in the BSS 2 is 1.5 hours. To maximize performance and battery life, maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F) when charging a FASTPAK battery.

To charge a FASTPAK battery in the BSS 2:

1. Place the battery in any BSS 2 compartment. The CHARGE indicator lights.

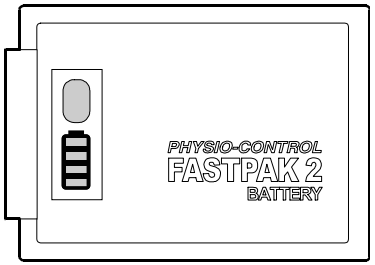
   Note: If the DISCARD indicator lights, the battery has a voltage of less than 4.5 vdc and cannot be charged. Remove the battery and **discard/recycle**.

2. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator lights after recharging, the battery has low capacity. Remove the battery and **discard/recycle**.

Charging Batteries

FASTPAK 2 Battery Charging



The typical charge time for a fully depleted FASTPAK 2 battery in the BSS 2 is 1.5 hours. To maximize performance and battery life, maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F) when charging a FASTPAK 2 battery.

Note: If a FASTPAK 2 battery is charged in the BSS or the LIFEPAK 12 defibrillator/monitor, the battery fuel gauge will eventually give false indications. To correct this problem, see **FASTPAK 2 Battery Conditioning**.

To charge a FASTPAK 2 battery in the BSS 2:

1. Place the battery in any BSS 2 compartment. The CHARGE indicator lights.

   Note: If the DISCARD indicator lights, the battery has been cycled more than 750 times, is at least 5 years old, has a fault, has low capacity, or has discharged to 4.5 vdc or less. Remove and **discard/recycle** the battery.

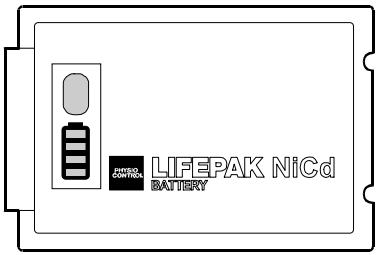
   Note: If the CONDITION indicator lights instead of the CHARGE indicator, refer to **FASTPAK 2 Battery Conditioning**.

2. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator lights after recharging, the battery has low capacity. Remove the battery and **discard/recycle**.

Charging Batteries

LIFEPAK NiCd Battery Charging



The typical charge time for a fully depleted LIFEPAK NiCd battery is 2.25 hours for the 1.7 A/H battery, and 3 hours for the 2.4 A/H battery. To maximize performance and battery life, maintain an ambient temperature for the BSS 2 between 20° C and 25.5°C (68°F and 78°F) when charging a LIFEPAK NiCd battery.

Note: If a LIFEPAK NiCd battery is charged in the BSS or the LIFEPAK 12 defibrillator/monitor, the battery fuel gauge will eventually give false indications. To correct this problem, see **LIFEPAK NiCd Battery Conditioning**.

To charge a LIFEPAK NiCd battery in the BSS 2:

1. Place the battery in any BSS 2 compartment. The CHARGE indicator lights.

   Note: If the DISCARD indicator lights, the battery has been cycled more than 500 times, is at least 5 years old, has a fault, has low capacity, or has discharged to 4.5 vdc or less. Remove and **discard/recycle** the battery.

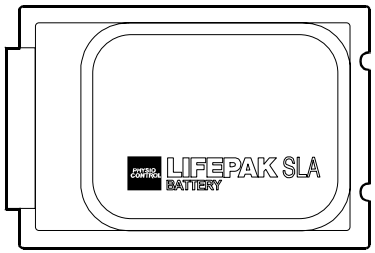
   Note: If the CONDITION indicator lights instead of the CHARGE indicator, refer to **LIFEPAK NiCd Battery Conditioning**.

2. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator lights after recharging, the battery has low capacity. Remove the battery and **discard/recycle**.

Charging Batteries

LIFEPAK SLA Battery Charging



The typical charge time for a fully depleted LIFEPAK SLA battery in the BSS 2 is 6 hours (12-hour maximum). To maximize performance and battery life, maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F) when charging a LIFEPAK SLA battery.

To charge a LIFEPAK SLA battery in the BSS 2:

1. Place the battery in any BSS 2 compartment. The CHARGE indicator lights.

   Note: If the DISCARD indicator lights, the battery has been cycled more than 100 times, is at least 3 years old, has a fault, has low capacity, or has discharged to 4.5 vdc or less. Remove and **discard/recycle** the battery.

   Note: If the CONDITION indicator lights instead of the CHARGE indicator, refer to **LIFEPAK SLA Battery Conditioning**.

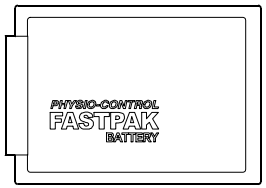
2. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

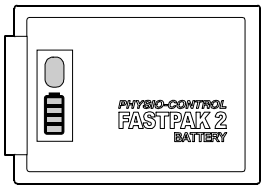
   Note: If the DISCARD indicator lights after recharging, the battery has low capacity. Remove the battery and **discard/recycle**.

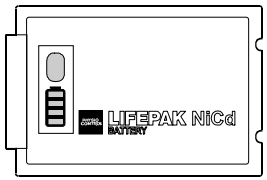
   Note: The LIFEPAK SLA battery may be charged using the AC or DC power adapter only, if desired, the Battery Support System 2 (BSS2) is not required.

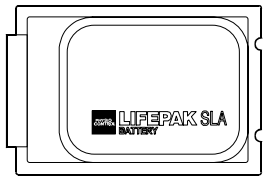
Charging Batteries

Battery Charging in the LIFEPAK 12 defibrillator/monitor









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WARNINGS!

Possible device shutdown during patient care. **The AC and DC Power Adapters trickle-charge batteries; they do not maintain batteries. Maintain batteries with the appropriate Medtronic Physio-Control Battery Support System.**

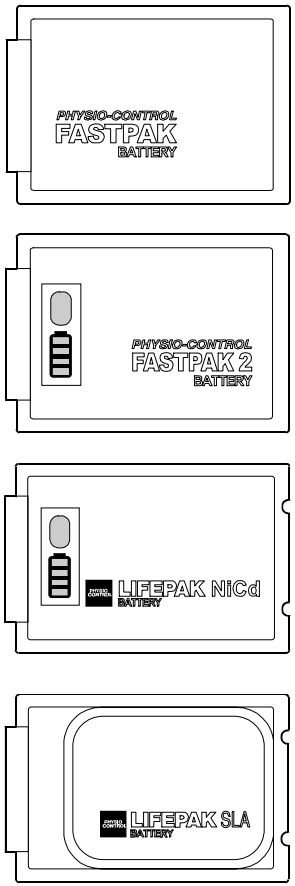
Possible loss of power during patient care. **Do not connect more than one DC output extension cable between the AC or DC Power Adapter and the LIFEPAK 12 defibrillator/monitor. The resultant voltage drop may prevent the power adapter from charging the batteries or operating the LIFEPAK 12 defibrillator/monitor. Always connect the power adapter directly to the defibrillator or use only one extension cable.**

Shock hazard. **Using a power line cord other than the one supplied with the AC Power Adapter could cause excess leakage currents. Use only the AC Power Adapter power cord (PN 803650).**

Refer to the LIFEPAK 12 defibrillator/monitor **Operating Instructions – AC and DC Power Adapters** for details about charging batteries installed in the LIFEPAK 12 defibrillator/monitor. Each of these batteries may be charged in the LIFEPAK 12 defibrillator/monitor when it is powered by an AC or DC Power Adapter. However, all conditioning and shelf life testing must be performed in the BSS (FASTPAK) or BSS 2 (FASTPAK, FASTPAK 2, LIFEPAK NiCd, and LIFEPAK SLA).

Conditioning Batteries

Overview



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Conditioning is a series of charge/deep discharge cycles performed in the BSS 2 to measure and optimize battery capacity. Condition the FASTPAK, FASTPAK 2, LIFEPAK NiCd, and LIFEPAK SLA batteries in the BSS 2.

Note: The LIFEPAK 12 defibrillator/monitor with AC or DC Power Adapter cannot condition batteries.

Note: While it is permissible to condition the FASTPAK battery in the original BSS, it is beyond the scope of this manual to describe that process.

Note: If a power failure occurs during battery conditioning, the BSS 2 interrupts conditioning and reverts to CHARGE Mode once power is restored. Battery conditioning may not have been completed. Repeat the conditioning process.

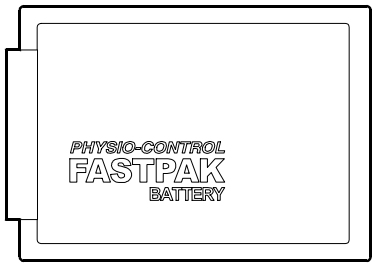
The recommended frequency for conditioning of FASTPAK, FASTPAK 2 and LIFEPAK NiCd batteries is every 3 months. LIFEPAK SLA batteries may be conditioned as desired, although routine conditioning is not required.

For detailed instructions on battery conditioning, select from the following:

- **FASTPAK Battery Conditioning**
- **FASTPAK 2 Battery Conditioning**
- **LIFEPAK NiCd Battery Conditioning**
- **LIFEPAK SLA Battery Conditioning**

Conditioning Batteries

FASTPAK Battery Conditioning



Allow approximately 7 hours to condition a FASTPAK battery. Maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F) during conditioning.

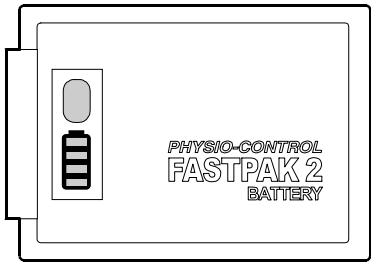
To condition a FASTPAK battery in the BSS 2:

1. Place the battery into any battery well.
2. Press the CONDITION control.
3. The READY indicator after conditioning is complete.

   Note: If the DISCARD indicator, remove the battery from use and **discard/recycle**.
4. Remove the FASTPAK battery from the BSS 2 and record the conditioning date on the back of the battery.

Conditioning Batteries

FASTPAK 2 Battery Conditioning



Allow approximately 7 hours to condition a FASTPAK 2 battery. Maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F) during conditioning.

To condition a FASTPAK 2 battery in the BSS 2:

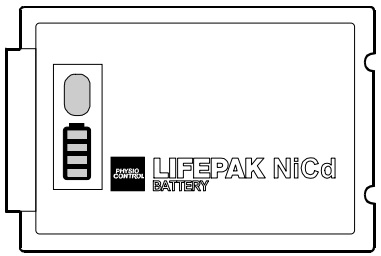
1. Place the battery into any battery well.
2. The CONDITION LED lights automatically when a FASTPAK 2 battery requires conditioning.

   Note: Press the CONDITION control for a conditioning cycle when desired.
3. READY lights after conditioning is complete.

   Note: If DISCARD lights, remove the battery from use and **discard/recycle**.
4. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

Conditioning Batteries

LIFEPAK NiCd Battery Conditioning



Allow approximately 10 hours to condition a 1.7 A/H LIFEPAK NiCd battery or 11 hours to condition a 2.4 A/H LIFEPAK NiCd battery. Maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F) during conditioning.

To condition a LIFEPAK NiCd battery in the BSS 2:

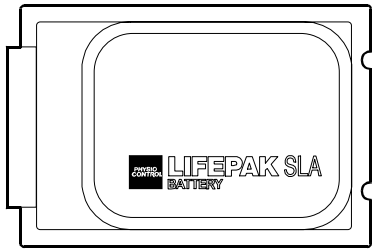
1. Place the battery into any battery well.
2. The CONDITION LED lights automatically when a LIFEPAK NiCd battery requires conditioning.

   Note: Press the CONDITION control for a conditioning cycle when desired.
3. The READY indicator lights after conditioning is complete.

   Note: If the DISCARD indicator lights, remove the battery from use and **discard/recycle**.
4. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

Conditioning Batteries

LIFEPAK SLA Battery Conditioning



LIFEPAK SLA Batteries do not require periodic conditioning as NiCd batteries do. For LIFEPAK SLA Batteries, the condition mode may be used to test battery performance or to determine whether a battery is viable.

Allow 28 hours typical (56 hours maximum) to condition a LIFEPAK SLA battery. Maintain an ambient temperature for the BSS 2 between 20° and 25.5°C (68° and 78°F) during conditioning.

To condition a LIFEPAK SLA battery in the BSS 2:

1. Place the battery into any battery well.
2. The CONDITION LED lights automatically when a LIFEPAK SLA battery requires conditioning.

   Note: Press the CONDITION control for a conditioning cycle when desired.
3. READY lights after conditioning is complete.

   Note: If DISCARD lights, remove the battery from use and **discard/recycle**.
4. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

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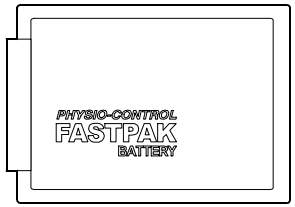
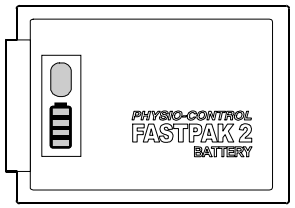
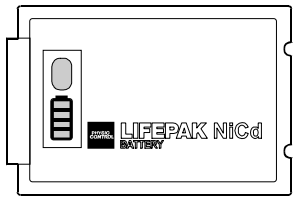
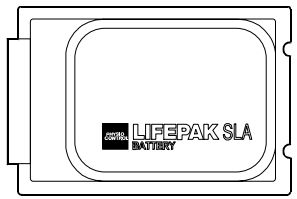
Shelf Life Testing Batteries

Overview









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Shelf Life Testing evaluates the self-discharge rate of a stored battery and rejects any battery that displays an excessive rate of self-discharge. Typically, a FASTPAK, FASTPAK 2, or LIFEPAK NiCd battery will self-discharge at approximately 1% of capacity every day, and a LIFEPAK SLA battery will self-discharge at approximately 0.1% of capacity every day at a temperature between 20°C and 25.5°C (68°F and 78°F).

The recommended frequency for shelf life testing is every 6 months.

Note: Shelf Life testing is optional for LIFEPAK SLA batteries.

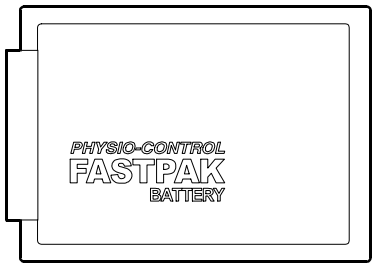
Note: While it is permissible to shelf life test the FASTPAK battery in the original BSS, it is beyond the scope of this manual to describe that process.

For detailed instructions on shelf life testing, select from the following:

- **FASTPAK Battery Shelf Life Testing**
- **FASTPAK 2 Battery Shelf Life Testing**
- **LIFEPAK NiCd Battery Shelf Life Testing**
- **LIFEPAK SLA Battery Shelf Life Testing**

Shelf Life Testing Batteries

FASTPAK Battery Shelf Life Testing



Allow approximately 8 days for shelf life testing a FASTPAK battery in a BSS 2. Maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F).

To shelf life test a FASTPAK battery in the BSS 2:

1. Complete **FASTPAK Battery Conditioning** for the battery. Remove the battery from the BSS 2 and store for 7 days.

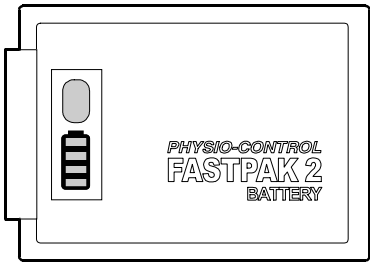
2. After 7 days have elapsed, place the battery in any battery well, then press the SHELF LIFE control within 3 seconds. Verify the SHELF LIFE indicator lights.

3. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator lights, the battery has failed shelf life testing. Remove the battery and **discard/recycle**.

Shelf Life Testing Batteries

FASTPAK 2 Battery Shelf Life Testing



Allow approximately 8 days for shelf life testing a FASTPAK 2 battery in a BSS 2. Maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F).

To shelf life test a FASTPAK 2 battery in the BSS 2:

1. Complete **FASTPAK 2 Battery Conditioning** for the battery. Remove the battery from the BSS 2 and store for 7 days.

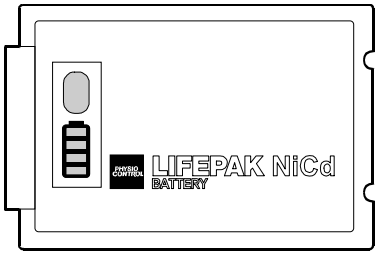
2. After 7 days have elapsed, place the battery in any battery well, then press the SHELF LIFE control within 3 seconds. Verify the SHELF LIFE indicator lights.

3. Remove the charged battery when the READY indicator lights, or leave it in the BSS 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator lights, the battery has failed shelf life testing. Remove the battery and **discard/recycle**.

Shelf Life Testing Batteries

LIFEPAK NiCd Battery Shelf Life Testing



Allow approximately 8 days for shelf life testing a 1.7 or a 2.4 A/H LIFEPAK NiCd battery in a BSS 2. Maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F).

To shelf life test a LIFEPAK NiCd battery in the BSS 2:

1. Complete **LIFEPAK NiCd Battery Conditioning** for the battery. Remove the battery from the BSS 2 and store for 7 days.

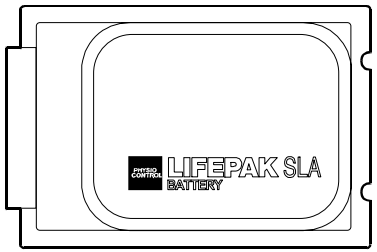
2. After 7 days have elapsed, place the battery in any battery well, then press the SHELF LIFE control within 3 seconds. Verify the SHELF LIFE indicator lights.

3. Remove the charged battery when the READY indicator lights, or leave in the BSS 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator lights, the battery has failed shelf life testing. Remove the battery and **discard/recycle**.

Shelf Life Testing Batteries

LIFEPAK SLA Battery Shelf Life Testing



Allow approximately 8 days for shelf life testing a LIFEPAK SLA battery in a BSS 2. Maintain an ambient temperature for the BSS 2 between 20°C and 25.5°C (68°F and 78°F).

To shelf-life test a LIFEPAK SLA battery in the BSS 2:

1. Complete **LIFEPAK SLA Battery Conditioning** for the battery. Remove the battery from the BSS 2 and store for 7 days.

2. After 7 days have elapsed, place the battery in any battery well, then press the SHELF LIFE control within 3 seconds. Verify the SHELF LIFE indicator lights.

3. Remove the charged battery when the READY indicator lights, or leave it in the BSS 2 to maintain the battery at peak capacity.

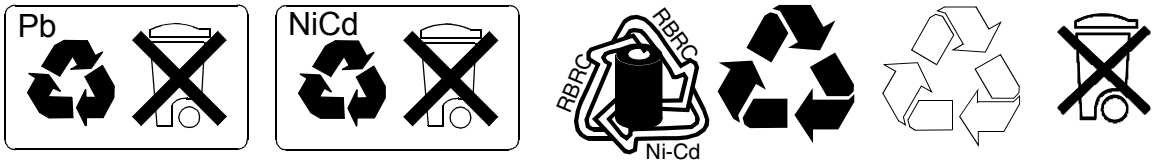
   Note: If the DISCARD indicator lights, the battery has failed shelf life testing. Remove the battery and **discard/recycle**.

Discarding/Recycling Batteries

Properly maintained FASTPAK batteries have a useful life of approximately 2 years. Properly maintained FASTPAK 2 batteries have a useful life of up to 5 years. Properly maintained LIFEPAK SLA battery have a useful life of up to 3 years. A FASTPAK, FASTPAK 2, or LIFEPAK SLA battery is at the end of its useful life if one or more of the following circumstances occur:

- There is physical damage to the battery case.
- The battery is leaking.
- The BSS 2 indicates DISCARD during any BSS 2 maintenance procedure.

To promote awareness of battery recycling, FASTPAK, FASTPAK 2, and LIFEPAK SLA batteries are marked with one of these symbols:



Storing Batteries

WARNING!

Possible loss of power during patient care. Stored batteries lose charge. Failure to charge a battery before use may cause device power failure without warning. Always charge a stored battery before placing it in use.

A battery is considered to be in storage when it is not in active use, is not in active rotation for use, or is not being actively maintained.

Store batteries in or out of the BSS 2 except when performing the shelf life test. During storage, batteries still require routine maintenance. Refer to **Conditioning Batteries** and **Shelf Life Testing Batteries**.

FASTPAK, FASTPAK 2, LIFEPAK NiCd, and LIFEPAK SLA batteries require special handling procedures for storage and then placing in use.

- Store batteries between 4.4°C and 26.7°C (40°F and 80°F). Lower temperatures reduce the battery self-discharge rate. Higher temperatures increase the self-discharge rate.
- Fully charge LIFEPAK SLA batteries before storing.
- Do not freeze batteries. Damage to the battery may result.
- Charge stored batteries before placing in use.

Receiving New Batteries

WARNING!

Possible loss of power during patient care. New batteries may not be fully charged. Failure to charge a battery before use may cause device power failure without warning. Always charge a new battery before placing it in use.

When you receive new batteries:

- Promptly label each new battery. Use a unique identification number to easily track the battery through all maintenance and rotation procedures.
- Charge each new battery prior to placing in use. See **Charging Batteries**.

Replacement Procedures

The Replacement Procedures are a set of detailed instructions for disassembly, handling, and reassembly of replaceable LIFEPAK 12 defibrillator/monitor assemblies. Perform an interior inspection whenever the LIFEPAK 12 defibrillator/monitor case is opened for service. When disconnecting cables and wire harnesses, label the cables and connections so that they match easily during reassembly, e.g., J01, J03, etc. Refer to the **Interconnect Diagram** for additional information.

While most activities start with the procedure **Disassembling Case**, you must be familiar with the contents of this section, which includes the following:

Summary of Replacement Procedures

Warnings and Cautions

Static Sensitive Device Handling

Building a Capacitor Discharge Tool (T01)

Using the Capacitor Discharge Tool (T01)

Discharging Energy Storage Capacitor

Discharging Pacing Capacitor

Saving Setup Configuration

Restoring Setup Configuration

Summary of Replacement Procedures

Replacement procedures are referenced and linked in the **Inside Front Case** and **Inside Rear Case** drawings. To simplify cable referencing, only the cable number is used in the replacement procedures. For example, the W01 Power PCB/System PCB Cable is referenced in procedures as the W01 Cable.

Choose from the following replacement procedures:

A01 System PCB
A02 Memory PCB
A03 Power PCB
A04 Therapy PCB—Edmark Devices Only
A04 Therapy PCB—Biphasic Devices Only
A05 Interface PCB
A06 OEM PCB
A07 Smart Contact PCB
A08 Backlight PCB—LCD Devices Only
A09 Small Keypad
A10 Large Keypad
A11 EL Display Assembly
A11 LCD Assembly
A12 Printer Assembly (50 mm)
A12 Printer Assembly (100 mm)
A13 Transfer Relay Assembly—Edmark Devices Only
A13 Transfer Relay Assembly—Biphasic Devices Only
A14 Waveshaping Inductor—Edmark Devices Only
A14 Inductive Resistor—Biphasic Devices Only

Summary of Replacement Procedures

A15 Energy Storage Capacitor—Edmark Devices Only
A15 Energy Storage Capacitor—Biphasic Devices Only
A16 SpO2 Module
A17 Interconnect Bracket
A21 NIBP Module
A22 Biphasic PCB—Biphasic Devices Only
A23 CO2 Module
EMI Shield
W01 Power PCB/System PCB Cable
W02 Power PCB/Therapy PCB Cable
W03 System PCB/Therapy PCB Connector
W04 System PCB/Interface PCB Cable
W05 Power PCB/Contact PCB Cable
W06 Backlight PCB/Interface PCB Cable
W07 ECG Connector Cable
W08 System Connector Cable
W09 Auxiliary Connector Cable
W10 Battery Pins/Power PCB Cable—Edmark Devices Only
W10 Battery Pins/Power PCB Cable—Biphasic Devices Only
W11 Therapy Connector Cable
W12 Small Keypad/Interface PCB Cable

Summary of Replacement Procedures

W13 Large Keypad/Interface PCB Cable
W14 System PCB/PC Card Slot Cable
W15 Selector Assembly
W16 Printer Assembly/Interface PCB Cable
W17 Speaker Assembly
W18 LCD Assembly/Interface PCB Cable—LCD Devices Only
W19 Printer Assembly/Chassis Ground Cable
W21 OEM PCB to SpO2 PCB Cable
W22 SpO2 Connector Cable
NIBP Connector Removal
W26 A06 OEM PCB to CO2 Cable
W27 A06 OEM PCB to NIBP Cable
W28 CO2 Connector Assy
W30 CO2 Adapter Cable Replacement
W31 CO2 Exhaust Tubing Replacement
W33 Invasive Pressure Connector Assembly
Battery Pin
Coin Battery
Software and Device Upgrades
Verifying the Device Configuration Data
Front Case
Rear Case—Edmark Devices Only
Rear Case—Biphasic Devices Only
Parameter Bezel Replacement
A12 Printer (50 mm) Repair Procedure
A12 Printer (100 mm) Repair Procedure
LIFEPAK 12 Voice Recorder

Warnings and Cautions

The following general warnings and cautions apply to all actions you may perform during maintenance of the LIFEPAK 12 defibrillator/monitor.

WARNINGS!

Shock hazard. Servicing of this device must be performed by properly trained individuals. This device may retain potentially lethal charges accessible inside the device at any time–even when off. Follow the procedures carefully for discharging the Energy Storage Capacitor and Pacing Storage Capacitor.

Shock hazard. The Energy Storage Capacitor and Pacing Storage Capacitor carry high voltage. Discharge the capacitors before handling.

Possible shock and device damage. It is possible to pinch and damage wires during reassembly. To avoid pinching wires, carefully follow reassembly instructions.

CAUTION!

Possible component damage. The PCB assemblies contain static sensitive devices (SSDs). To avoid damage, observe the special handling practices described in the section titled Static Sensitive Device Handling.

Static Sensitive Device Handling

About SSD Handling

Many electronic semiconductor devices (such as MOS ICs, FETs, optical isolators, or film resistors) can be damaged by the discharge of static electricity. Static charge buildup is very common. Static discharges commonly occur when the operator wears synthetic clothes and transfers the charge to any object touched. These discharges can damage or destroy Static Sensitive Devices (SSDs). In most cases, the discharge is not even perceptible to the person who causes it.

To prevent static discharge damage to SSDs, observe the following precautions during any open-case test, maintenance, or repair procedures:

Look for SSD Symbol

SSDs are identified with the following warning symbol:

Use Static-Dissipative Mat

Always perform repair or maintenance on a static-dissipative mat that is connected to earth ground.

Static Sensitive Device Handling

Wear a Wrist Strap

Always wear a conductive wrist strap connected to the mat and to ground except when working on energized equipment or when discharging high voltage circuits. The strap must be snug enough to make good contact against bare skin.

WARNING!

Shock hazard. Remove the wrist strap when working on energized equipment or when discharging high voltage circuits.

Transport and Store PCBs Properly

Transport and store PCBs in anti-static racks or inside conductive bags. Label the package that contains the PCBs as static-sensitive.

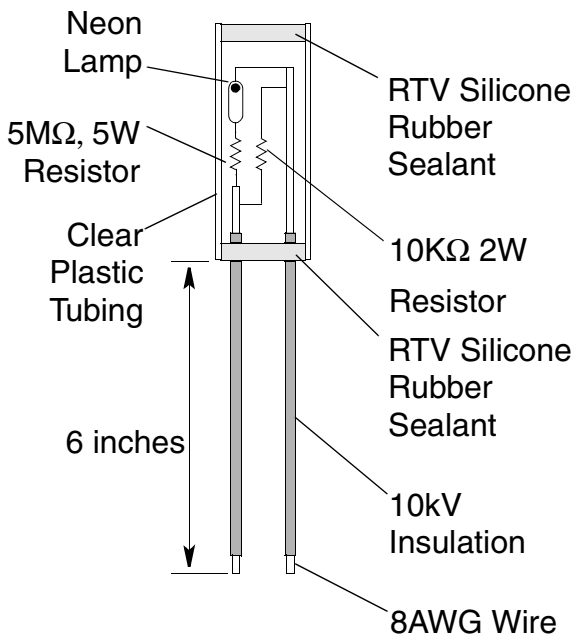
Keep Work Area Static-Free

Keep static-generating products such as styrofoam cups or trays away from the work area. Connect all electrical equipment such as soldering irons and test equipment to ground with a three-prong plug.

Test Work Area Routinely

Test all the anti-static parts of the work area (mat, straps, cables) routinely. Keep a log of the test results.

Building a Capacitor Discharge Tool (T01)



WARNING!

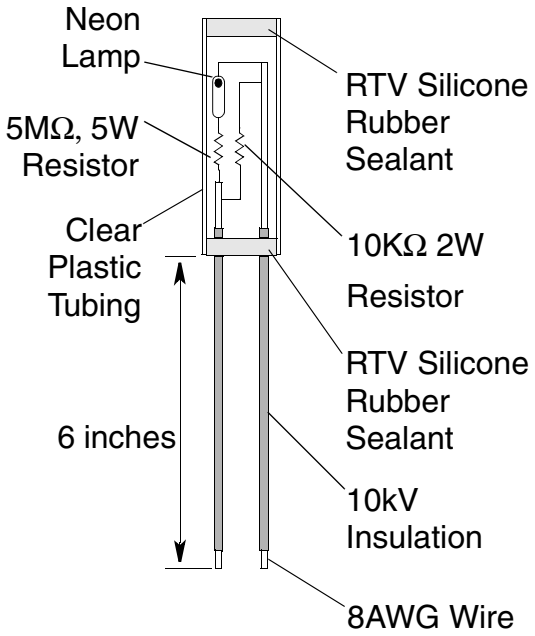
Shock hazard. Discharge tools that were not designed and labeled for Biphasic use are inadequate for use on Biphasic defibrillators. They will take several minutes to discharge the energy capacitor. Use only capacitor discharge tool PN 3012102 on Biphasic defibrillators.

A Capacitor Discharge Tool is constructed and used to discharge the A15 Energy Storage Capacitor and the A04 Therapy PCB-C15 pacing capacitor. The following materials are required:

- 10kΩ, 2W resistor (ten 1KΩ 2W), high-voltage
- 5MΩ, 5W resistor, high-voltage
- Neon lamp, NE76, NE2, or NE2H
- 8AWG copper wire
- Clear plastic tubing, capable of insulating 10kV
- 10kV insulation
- RTV, silicone rubber sealant

See **Using the Capacitor Discharge Tool** for information on using the tool for the **Discharging the Energy Storage Capacitor** and **Discharging the Pacing Capacitor** procedures.

Using the Capacitor Discharge Tool (T01)



WARNING!

Shock hazard. Discharge tools that were not designed and labeled for Biphasic use are inadequate for use on Biphasic defibrillators. They will take several minutes to discharge the energy capacitor. Use only capacitor discharge tool PN 3012102 on Biphasic defibrillators.

The Capacitor Discharge Tool is used in the **Discharging the Energy Storage Capacitor** and **Discharging the Pacing Capacitor** procedures.

To use the Capacitor Discharge Tool:

1. Place one probe on a discharge point and hold it steady.
2. Place the other probe on the remaining discharge point and hold both probes steady.
3. Observe the neon lamp inside the Capacitor Discharge Tool. If a charge of approximately 90 volts is present, the neon lamp will light.

WARNING!

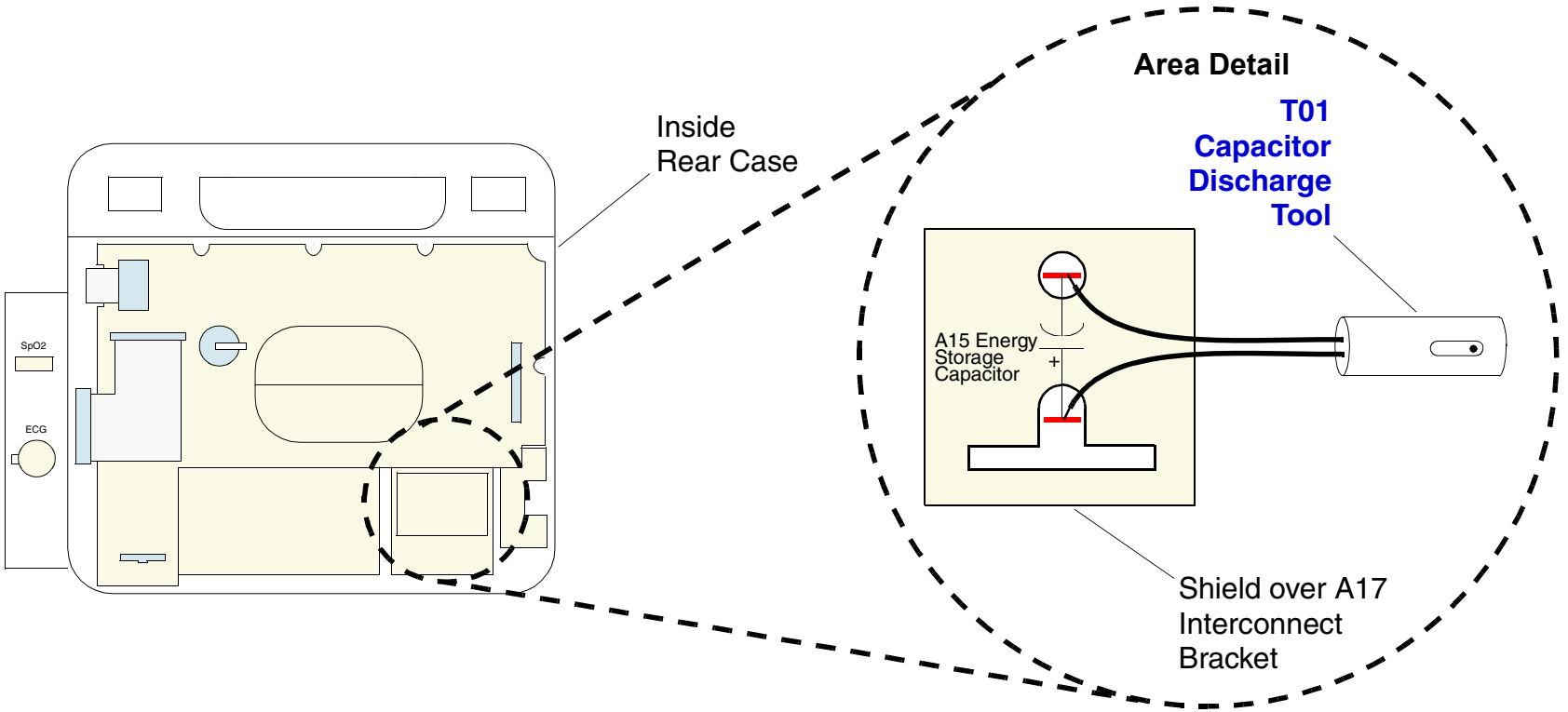
Shock hazard. Do not assume the capacitor is uncharged if the neon lamp does not light! There may still be a charge on the capacitor. Do not touch capacitor terminals until completing the discharge operation.

4. Continue holding the probes on the points indicated for at least 30 seconds after the neon lamp is no longer lit.

Discharging Energy Storage Capacitor

Location of Discharge Points

After case separation, immediately discharge the Energy Storage Capacitor (see **Using the Capacitor Discharge Tool**). The discharge points are located through holes on the A17 Interconnect Bracket (below) in the rear case.



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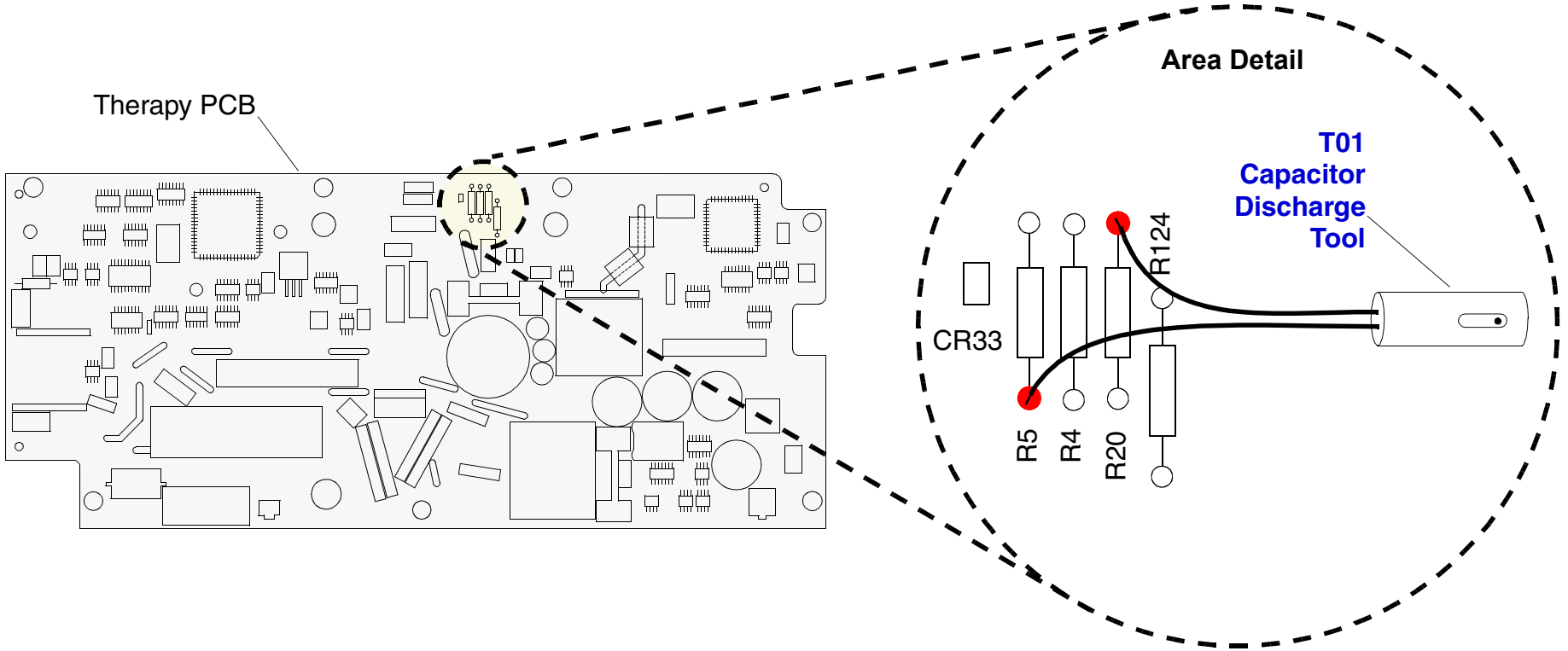
Discharging Pacing Capacitor

Location of Discharge Points

After removing the **System/Memory/Therapy PCB device**, immediately discharge the pacing capacitor (see **Using the Capacitor Discharge Tool**). The discharge points are located at resistors R5 and R20 on the Therapy PCB (see below).



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Saving Setup Configuration

The following procedures show you how to save the device setup configuration before beginning any repair action. The best method is to transfer the setup configuration to a spare device, complete repairs, and then transfer the setup configuration back again. To save the configuration in this manner, use the **Transfer and Save Setup Procedure**. The second method is to print the setup configuration, complete repairs, and then manually reconfigure the device.

Note: Saving the configuration with the **Transfer and Save Setup Procedure** requires that the software in the device being used for storage of configuration information is of the same revision. Otherwise potentially unexpected results may occur once the configuration has been restored to the repaired device.

Note: When using the **Transfer and Save Setup Procedure**, if the two devices are of different energy configurations (not both Edmark or both biphasic), the configuration information for default energy must be verified and, if required, restored manually.

Transfer and Save Setup Procedure

To transfer and save the setup configuration into a spare device:

1. With the power off in both devices, connect a Configuration Transfer Cable (PN 3011538) between the device System Connectors.

Saving Setup Configuration

2. At each device, hold down both the OPTIONS and EVENT controls and apply power. The SETUP overlay screen appears on both devices.
3. At the device to be repaired, select SEND CONFIG from the SETUP Menu. The SEND CONFIG screen appears.
4. With SEND selected on the SEND CONFIG screen, press the Selector. The setup configuration transfers to the spare device.
5. Select PRINT DEFAULTS from the SETUP Menu. The printer prints the device setup configuration. Save this backup printout for possible future reference.
6. Turn off both devices.

To print the setup configuration:

1. Hold down both the OPTIONS and EVENT controls and apply power. The SETUP overlay screen appears.
2. Select PRINT DEFAULTS from the SETUP Menu. The printer prints the device setup configuration. Save this printout for future reference.
3. Turn off the device.

Restoring Setup Configuration

The following procedures assume you completed **Saving the Setup Configuration** using a spare device with the same revision of software before starting repairs. If you saved the setup using the Transfer and Save Setup Procedure, continue the Restoring by Transfer Procedure. If you saved the setup manually, continue to the **Restoring Setup Manually Procedure**.

Restoring by Transfer Procedure

To restore the setup configuration by transfer:

1. Connect the spare device (with the desired setup configuration) and the repaired device with a Configuration Transfer Cable (PN 3011538) between the device System Connectors.
2. At each device, hold down both the OPTIONS and EVENT controls and apply power. The SETUP overlay screen appears on both devices.
3. At the spare device, select SEND CONFIG from the SETUP Menu. The SEND CONFIG screen appears.
4. Select SEND on the SEND CONFIG screen and press the Selector. The setup configuration transfers to the repaired device.
5. Turn off both devices.

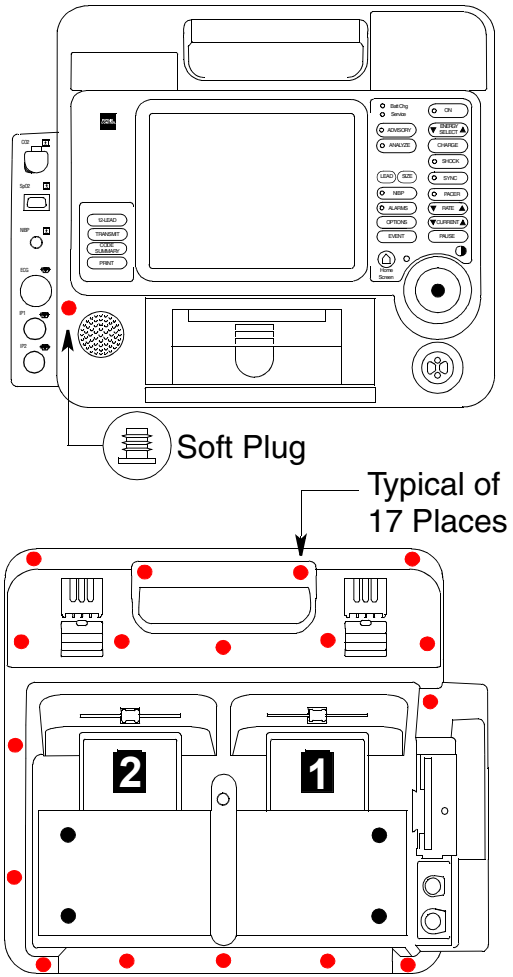
Restoring Setup Configuration

Restoring Setup Manually Procedure

To restore the setup configuration manually:

1. Hold down both the OPTIONS and EVENT controls and apply power. The SETUP overlay screen appears.
2. Using the printout from the Saving the Setup Configuration procedure, check the settings in each menu and revise as necessary to match the printout. The printout is organized in the same manner as the SETUP Menu: GENERAL, MANUAL MODE, ADVISORY MODE, and so forth.
3. Turn off the device.

Disassembling Case



To disassemble the case halves:

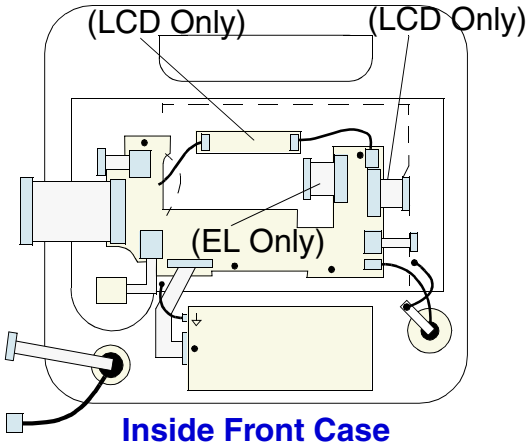
1. Remove all cables and patient connections, and remove the batteries.
2. Pry out the front case soft plug (**36**) and remove the hidden screw.
3. Lay the defibrillator on its face on a protective surface to prevent damage and then remove the 17 screws around the perimeter (**232**).
4. Holding the case halves together, stand the device upright and then move the front case away from the rear case.
5. Compress the connector retaining clips to disconnect the W04 Cable at A01 System PCB-J2 in the rear case.
6. So far as possible, move the front case away from the rear case, then, before doing anything further, conduct the **Discharging the Energy Storage Capacitor** procedure.

WARNING!

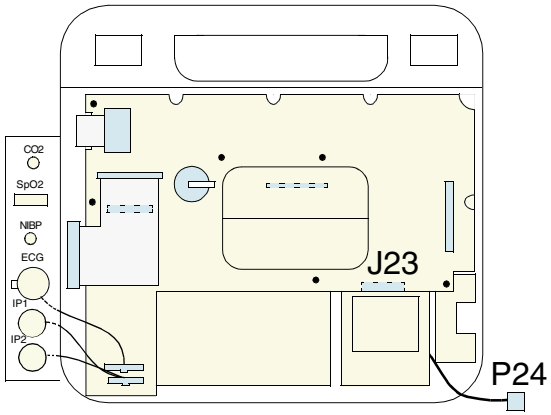
Shock hazard. Discharge tools that were not designed and labeled for Biphasic use are inadequate for use on Biphasic defibrillators. They will take several minutes to discharge the energy capacitor. Use only capacitor discharge tool PN 3012102 on Biphasic defibrillators.

7. To continue, press the securing clip and disconnect W11 Therapy Connector-J24 from A13 Transfer Relay-P24 in the rear case.

Disassembling Case



Inside Front Case



Inside Rear Case

8. Spread the securing clips and disconnect W11 Therapy Connector-P23 from Therapy PCB-J23 in the rear case.
9. Separate the front and rear cases halves.

See the **Reassembling Case** procedure to reassemble the case halves.

To continue, select from the **Summary of Replacement Procedures**.

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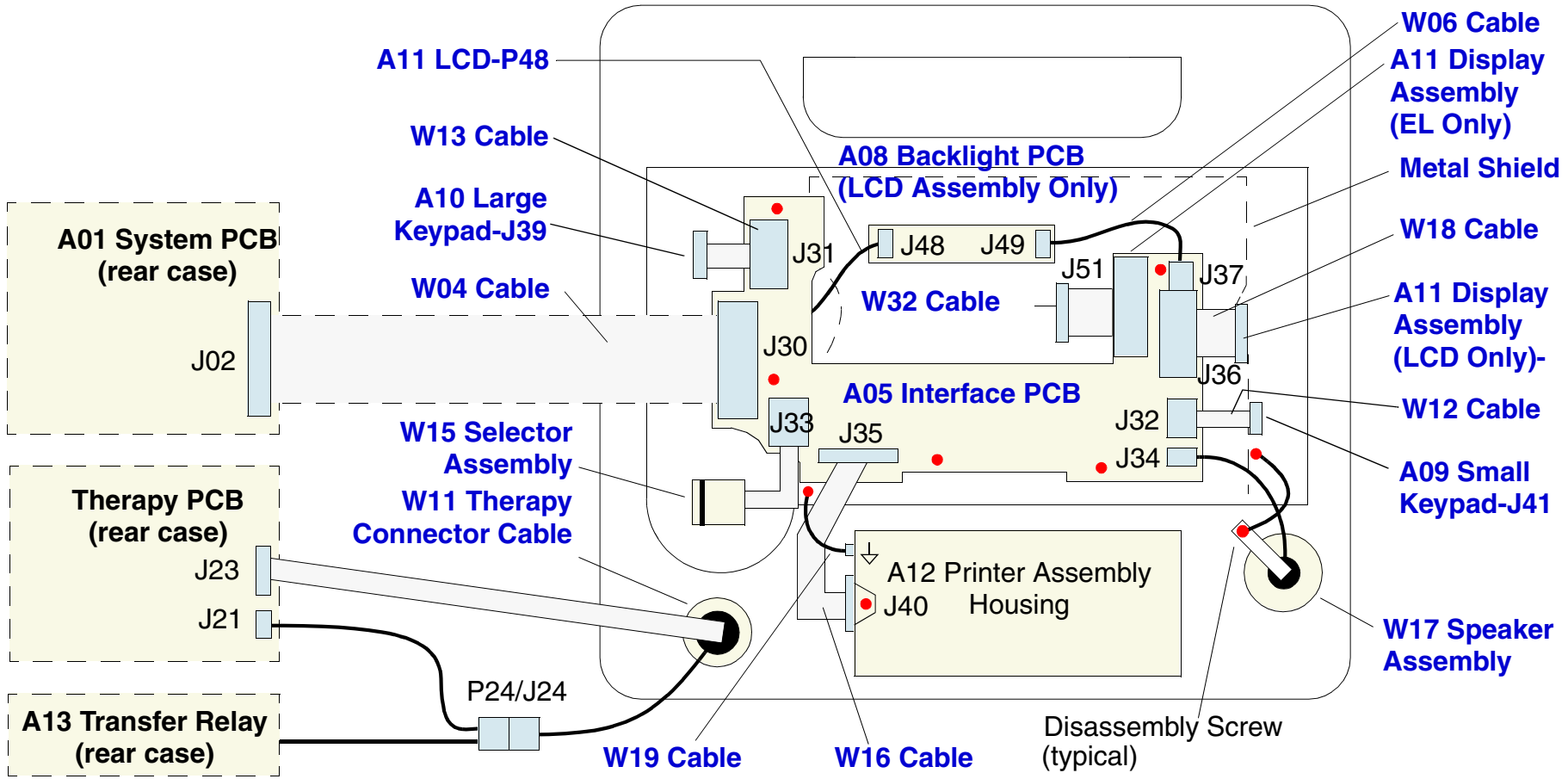
Inside Front Case

First View

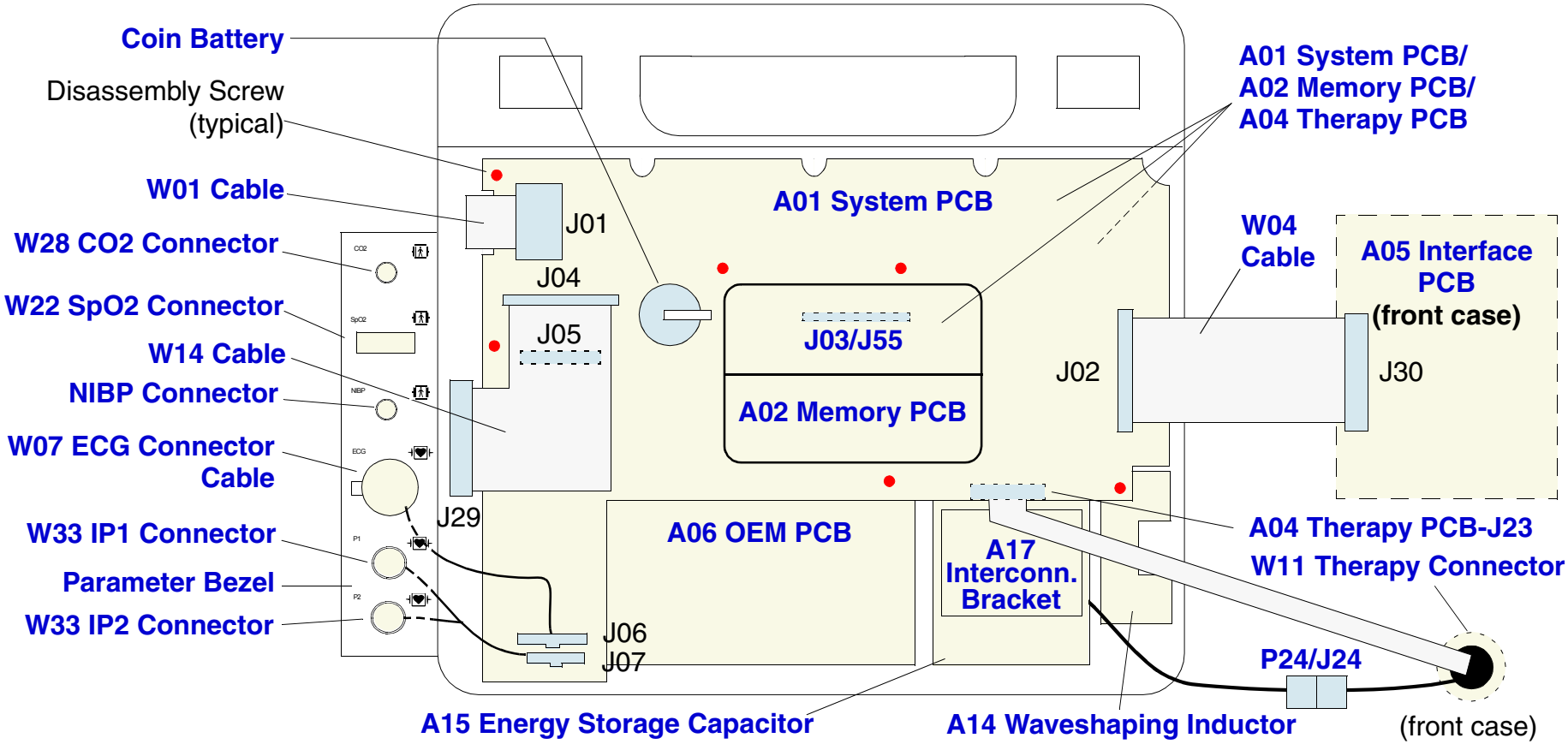
Use this drawing after completing the **Disassembling Case** procedure. For a list of replacement procedures, see **Summary of Replacement Procedures**.



Inside Rear Case—Edmark Devices

First View

Use this drawing after completing the **Disassembling Case** procedure. For a list of replacement procedures, see **Summary of Replacement Procedures**.



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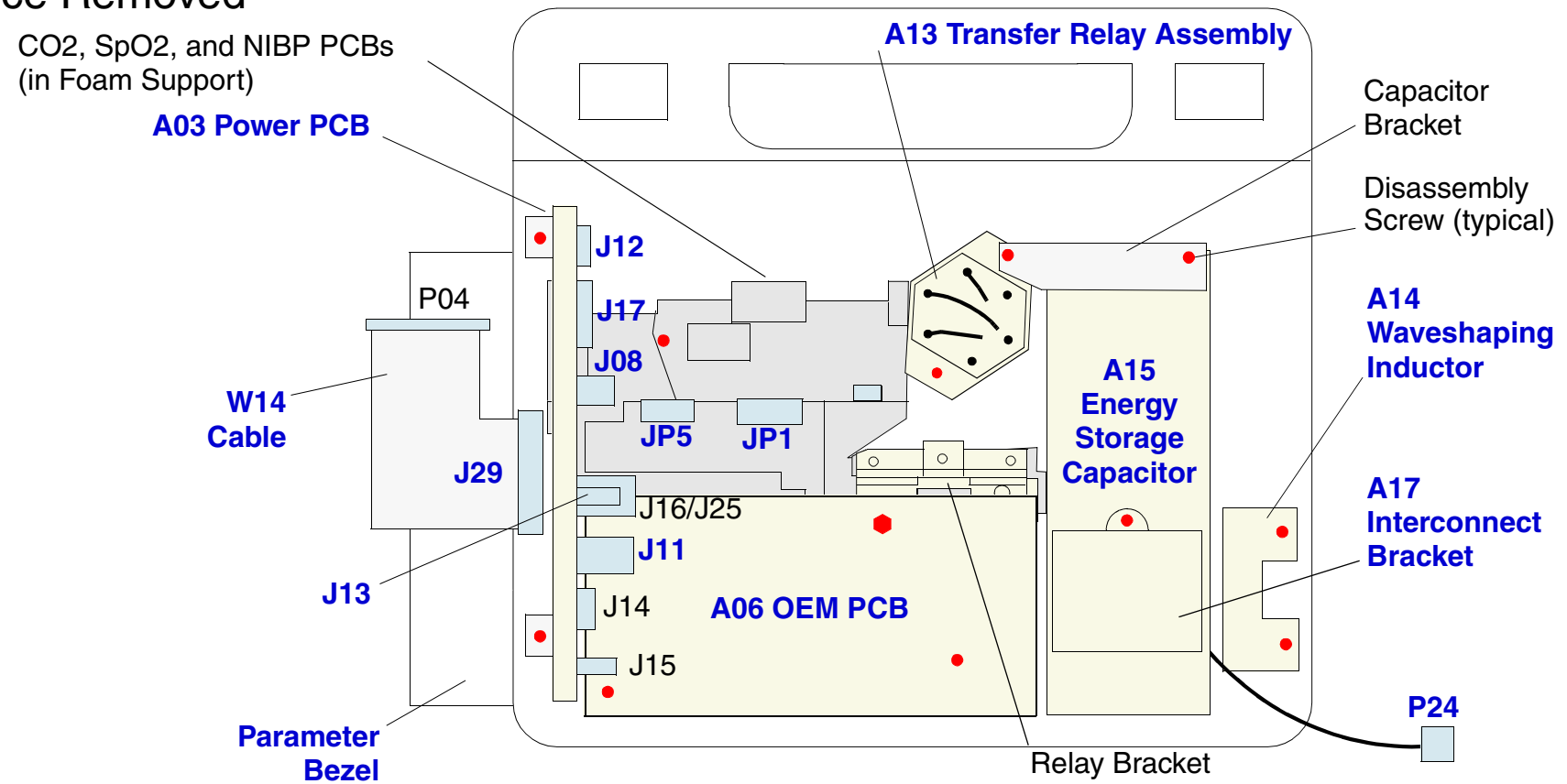
Inside Rear Case—Edmark Devices

A01 System/A02 Memory/A04 Therapy PCB Device Removed

Use this drawing after completing the **A01 System/A02 Memory/A04 Therapy PCB Disassembly** procedure. For a list of replacement procedures, see **Summary of Replacement Procedures**.



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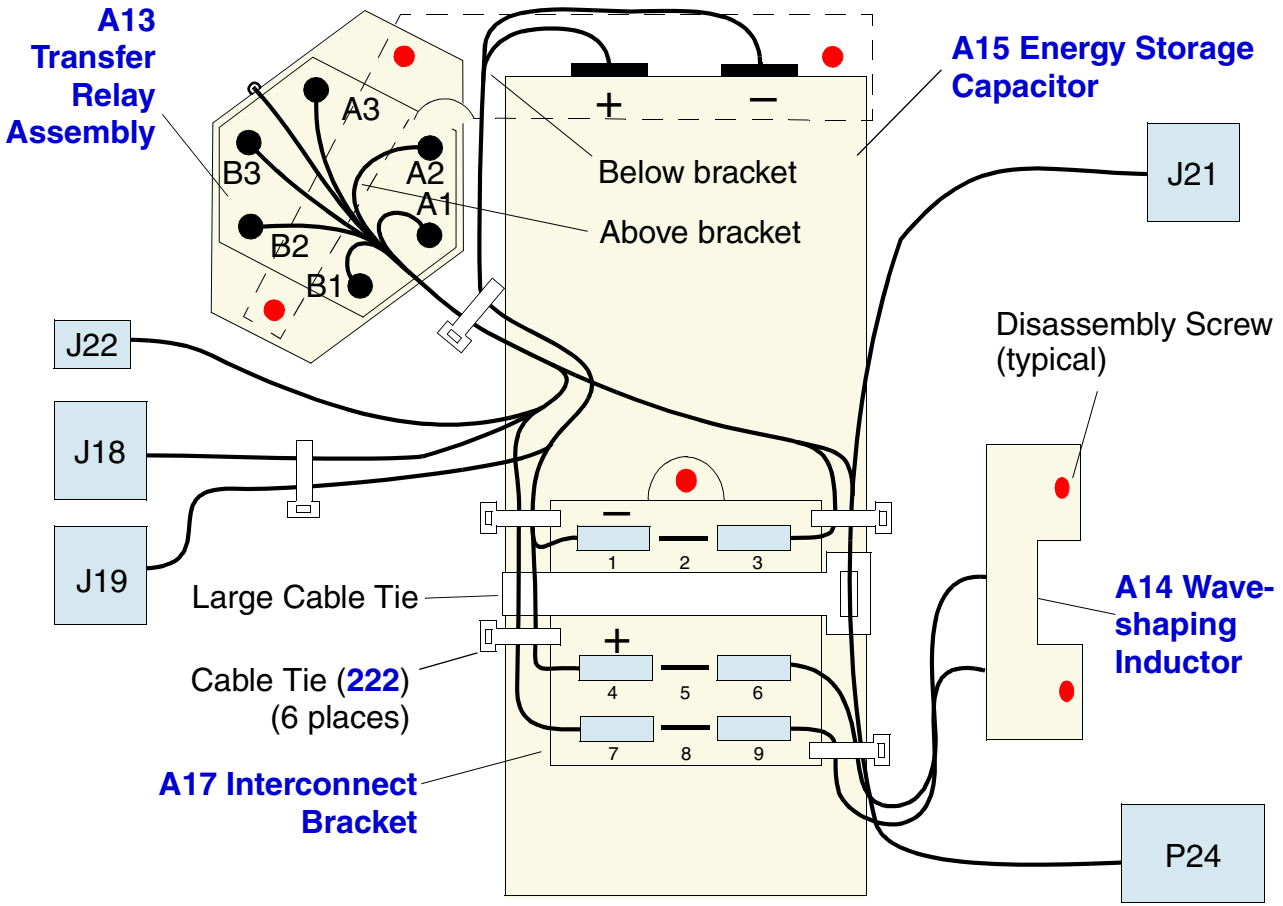
Inside Rear Case—Edmark Devices

Energy Transfer Detail Drawing

Use this drawing for replacing: A13 Transfer Relay Assembly, A14 Waveshaping Inductor, A15 Energy Storage Capacitor, and A17 Interconnect Bracket.



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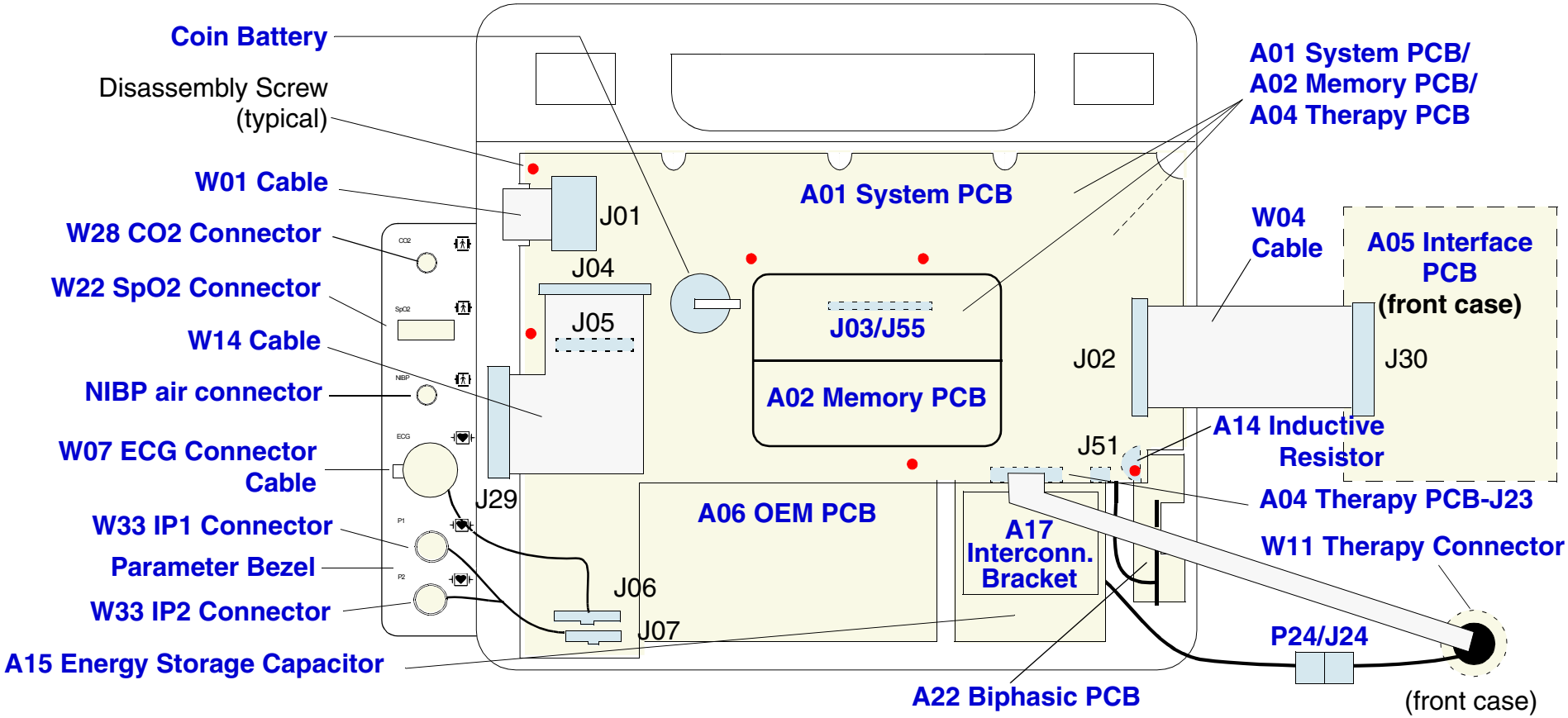
Inside Rear Case—Biphasic Devices

First View

Use this drawing after completing the **Disassembling Case** procedure. For a list of replacement procedures, see **Summary of Replacement Procedures**.



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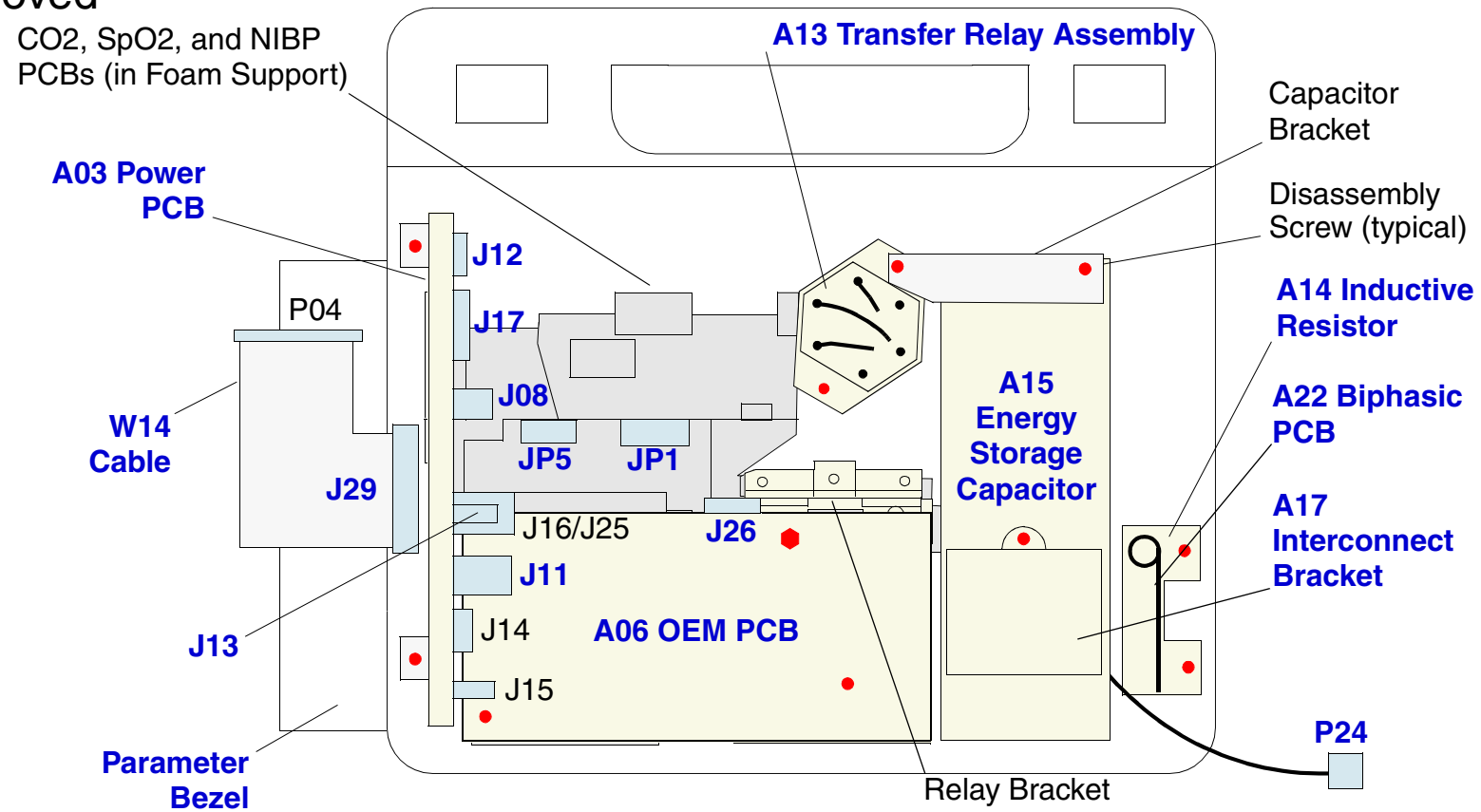
Inside Rear Case—Biphasic Devices

A01 System/A02 Memory/A04 Therapy PCB Device Removed

Use this drawing after completing the **A01 System/A02 Memory/A04 Therapy PCB Disassembly** procedure. For a list of replacement procedures, see **Summary of Replacement Procedures**.



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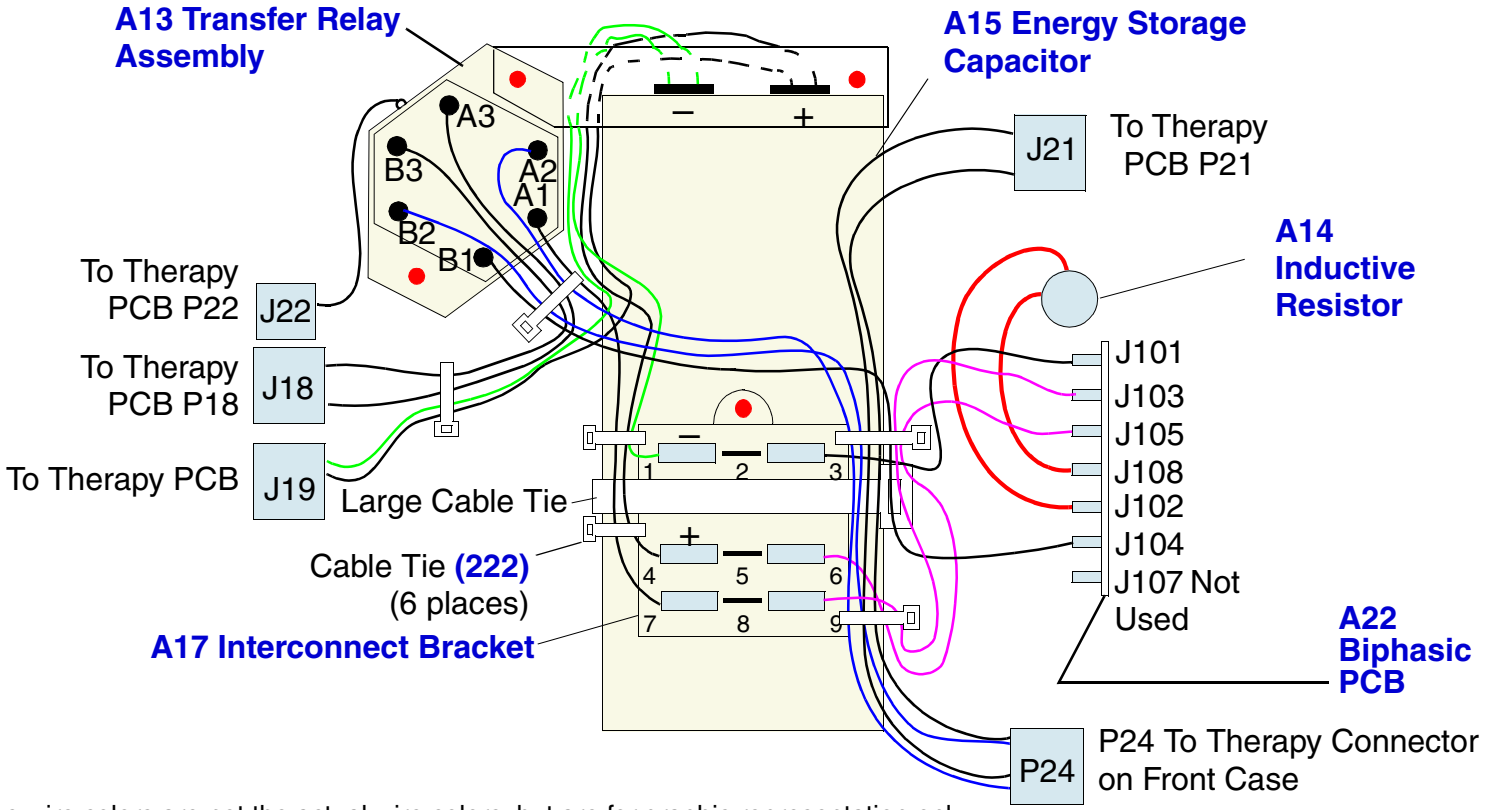
Inside Rear Case—Biphasic Devices

Energy Transfer Detail Drawing

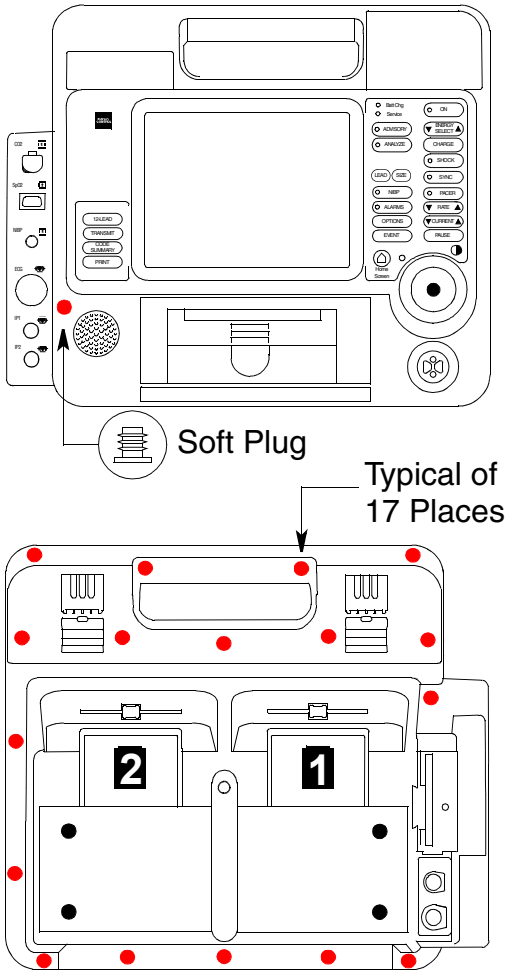
Use this drawing for replacing: A13 Transfer Relay Assembly, A22 Biphasic PCB, A15 Energy Storage Capacitor, and A17 Interconnect Bracket.



The wire colors are not the actual wire colors, but are for graphic representation only.

420

Reassembling Case



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To reassemble the case halves:

1. Connect the W11 Therapy Connector Cable-P23 to A04 Therapy PCB-J23.
2. Connect the W11 Therapy Connector Cable-J24 to A13 Transfer Relay Assembly-P24.
3. Connect the W04 Cable between A01 System PCB-J02 and A05 Interface PCB-J30.
4. Fold the front and rear case halves together and install 17 new screws (**232**) around the perimeter.

CAUTION!

Possible moisture leakage. Visually inspect the mating surfaces between the front and the rear case halves before and after screwing them together to help ensure that they look even.

Prevent vibration damage. In order to meet vibration specifications (e.g., prevent loosening of case screws, internal assemblies, etc.), use new screws when assembling the case (232).

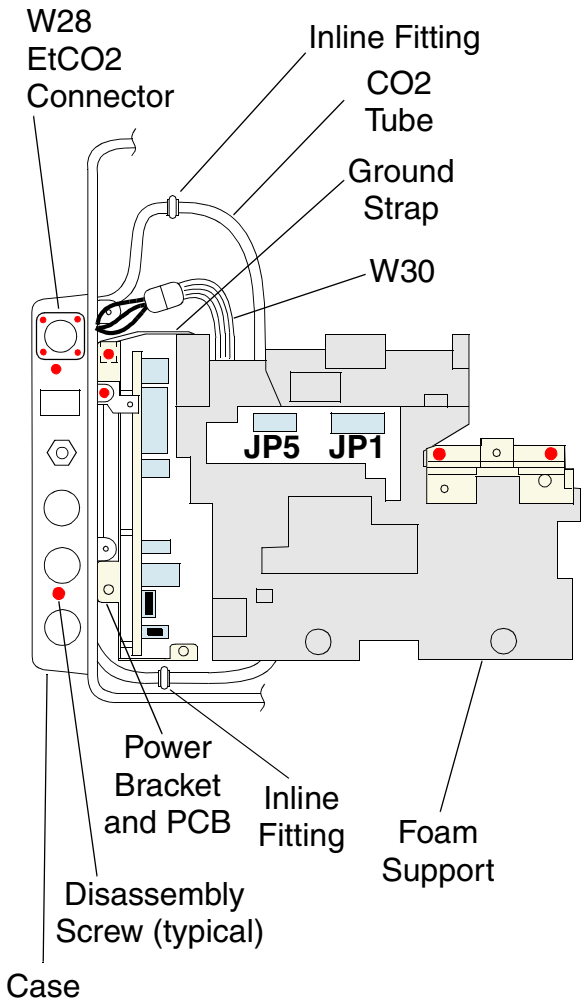
Reassembling Case

5. Install one new screw (**232**) at the front and reinstall the soft plug (**36**) covering the screw access hole.
6. Install the batteries.

   Note: Pay special attention to the SERVICE indicator as you turn on the device in the next step.

7. Turn on the device and observe the SERVICE indicator. If the SERVICE indicator is off, continue to Step 8. If the SERVICE indicator is on, continue to Step 9. If the device gives no indication that power is on, continue to Step 10.
8. Complete the **Test and Calibration Procedure (TCP)**, followed by the **Performance Inspection Procedure (PIP)**.
9. Error codes have been written to the error log. Continue to **Processing Error Codes** in the **Troubleshooting** section.
10. When there is no indication of power, this means either that the batteries are dead, that no batteries are installed, or that the W04 Cable connection was not made when the case was reassembled. The W04 Cable is the ribbon cable between the front case and rear case. Check the batteries and if they are charged, then conduct the procedure **Disassembling Case** and check the W04 Cable.

Parameter Bezel Removal



To remove the Parameter Bezel:

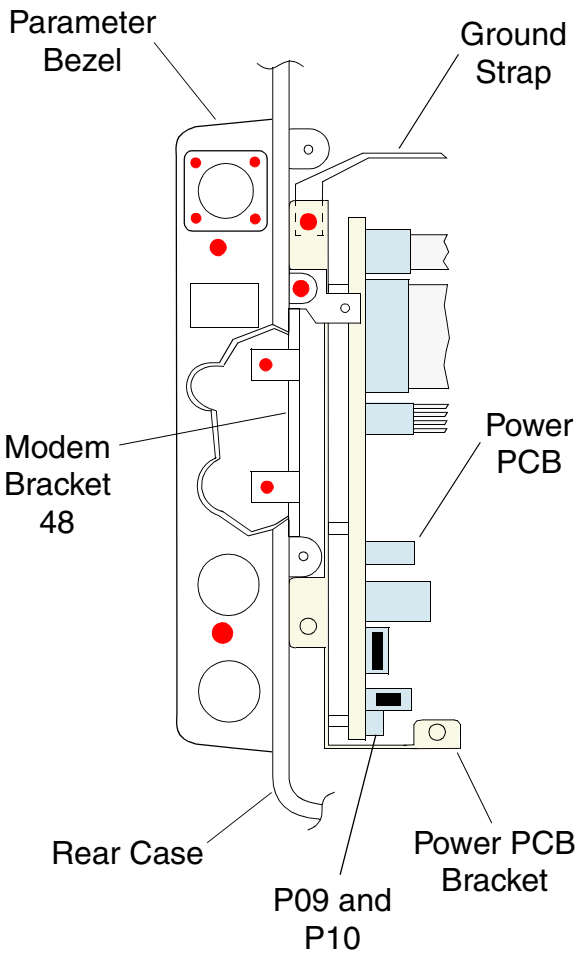
Note: These steps include the A06 OEM PCB and all options on the Parameter Bezel. Your device may not have some of these options.

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Complete the **A06 OEM PCB Replacement** steps 3 and on, if installed.
4. For orientation, locate components at **Inside Rear Case**.
5. Remove the retaining clip (**226**) and disconnect the W22 SpO2 Connector Cable from A16 SpO2 PCB at JP1.
6. Lift off Upper Foam Support (**22**).
7. Disconnect the NIBP PCB tube (**378**) at the barbed inline fitting.

Note: If the NIBP tube has been disconnected/reconnected from the inline fitting previously, each tube end should be trimmed to maintain an airtight seal.

8. Disconnect the W28 CO2 connector cable end from adapter cable W30.
9. Disconnect the W33 IP cable end from the J7 connector on the A01 System PCB Assembly.

Parameter Bezel Removal



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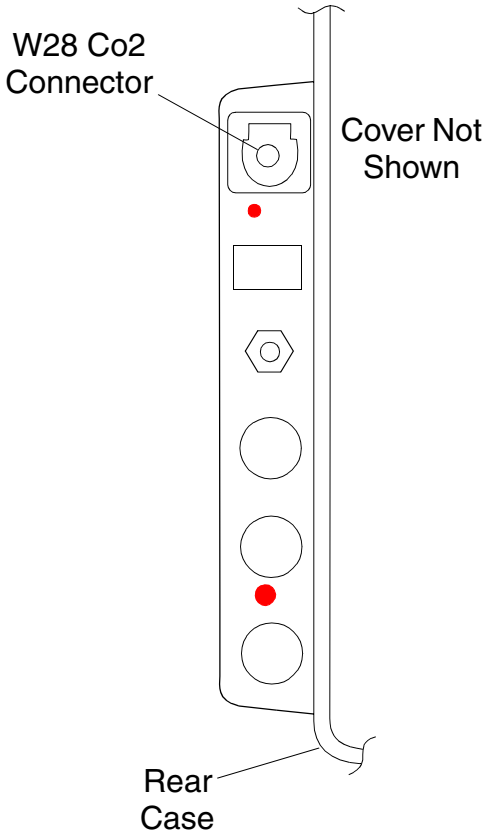
10. Remove the CO2 tube (coming from the bezel) from the routing clip, then disconnect it from jumper tube at the barbed inline fitting. (ECG cable connector W07 was disconnected during System/Memory/ Therapy PCB disassembly.)
11. Remove one screw (**230**) from the power bracket to free it from the ground strap (**370**) that is attached to the CO2 PCB.
12. Locate the W28 CO2 Connector Cover (**356**) on the bezel. Remove the cover.
13. Lift one corner of the Parameter Bezel label (**158**) and peel it off.
14. Remove the two screws (**230**) securing the Parameter Bezel to the rear case. Remove one screw (**230**) securing it to the modem bracket (**48**).
15. Pull the parameter bezel up and out just enough to unscrew two screws (**230**) attaching the modem bracket to the rear case. Partially lift the parameter bezel, modem bracket and power PCB bracket (**62**), with PCBs, out together until connectors P09 and P10 (System Connector Cable) are accessible. Disconnect both connectors by pressing retaining clips. Note all cable orientations for reassembly, then lift out parameter bezel with brackets.

Note: To remove any remaining cables from the Parameter Bezel see the instructions for the specific cable number (e.g., W07 ECG Connector Cable Replacement).

Parameter Bezel Removal



To assemble the Parameter Bezel, reverse the above steps and observe the following:

- Clean away any adhesive residue on the Parameter Bezel with isopropyl alcohol.

Note: Devices without EtCO2: Place a Label Spacer (**386**) into the CO2 recess in the bezel before applying the label.

- Use a new Parameter Bezel label (**158**). Press the label down firmly. Devices with EtCO2: To press around the CO2 connector, use a smooth, narrow tool such as a tuning tool (plastic screwdriver) or the large end of a car key.

CAUTION!

Possible moisture leakage. Visually inspect the mating surfaces between the Parameter Bezel and the rear case before and after screwing it down to help ensure that they look even.

Return to:

Parameter Bezel Replacement	**Rear Case—Biphasic or Edmark Devices**
CO2 Connector Removal	**ECG Connector Cable**
System Connector Cable	**Auxiliary Connector Cable**

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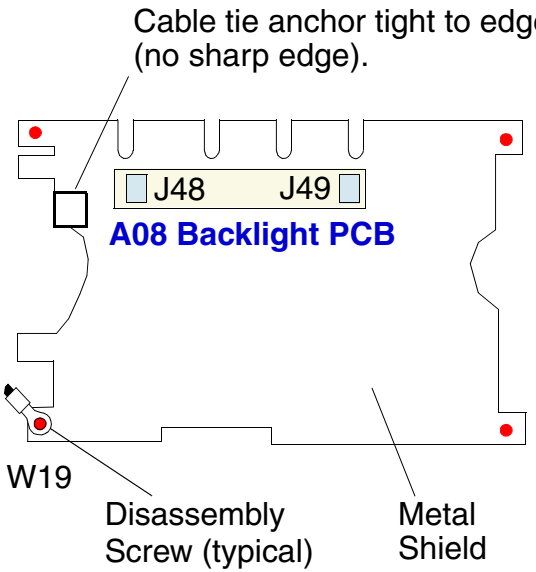
Disassembling Front Case Metal Shield—LCD Devices Only



To disassemble the front case metal shield (with A08 Backlight PCB intact):

1. Complete the procedure **Disassembling Case**.
2. For orientation, locate the metal shield on the **Inside Front Case** drawing.
3. If it is necessary, remove the **A08 Backlight PCB** from the front case metal shield. Otherwise, continue to step 4.
4. Remove the **A05 Interface PCB**.
5. Disconnect A11 LCD Assembly-P48 from A08 Backlight PCB-J48.
6. Cut the tie wrap (**222**) securing A11 LCD Assembly-P48 to the tie wrap anchor.
7. Remove the five screws (**230**) from the metal shield. Note the positioning of the eyelets for the W19 Cable (lower-left corner). Lift the metal shield away from the front case.

To install the front case metal shield, reverse the above steps. Observe the following:

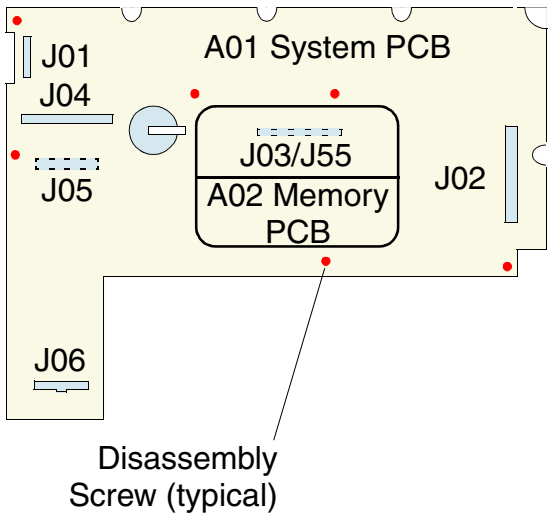
1. Use a new cable tie (**222**) with the metal shield tie wrap anchor (**188**).
2. Verify connector A11 LCD Assembly-P48 is not pinched under the shield.
3. Orient the eyelet for the W19 Cable correctly.

426

Disassembling Front Case Metal Shield—LCD Devices Only

For the next procedure, see **Summary of Replacement Procedures**, or return to **Display Lens Replacement**

System/Memory/Therapy PCB Disassembly



WARNING!

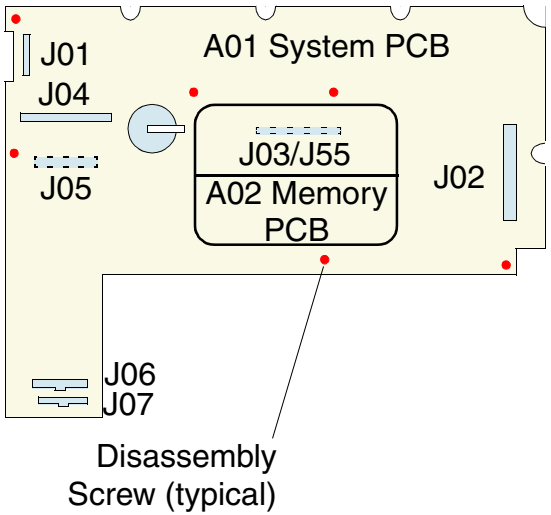
Shock hazard. Handle all PCBs by their edges until the Pacing Capacitor C15 on the Therapy PCB is discharged in step 8.

To remove the A01 System/A02 Memory/A04 Therapy PCBs as a device:

1. Complete the **Disassembling Case** procedure.
2. For orientation, locate the A01 System PCB on the **Inside Rear Case** drawing.

   Note: For the next step, remove **only** the six screws shown in the drawing to the left.
3. Remove six screws (**230**).

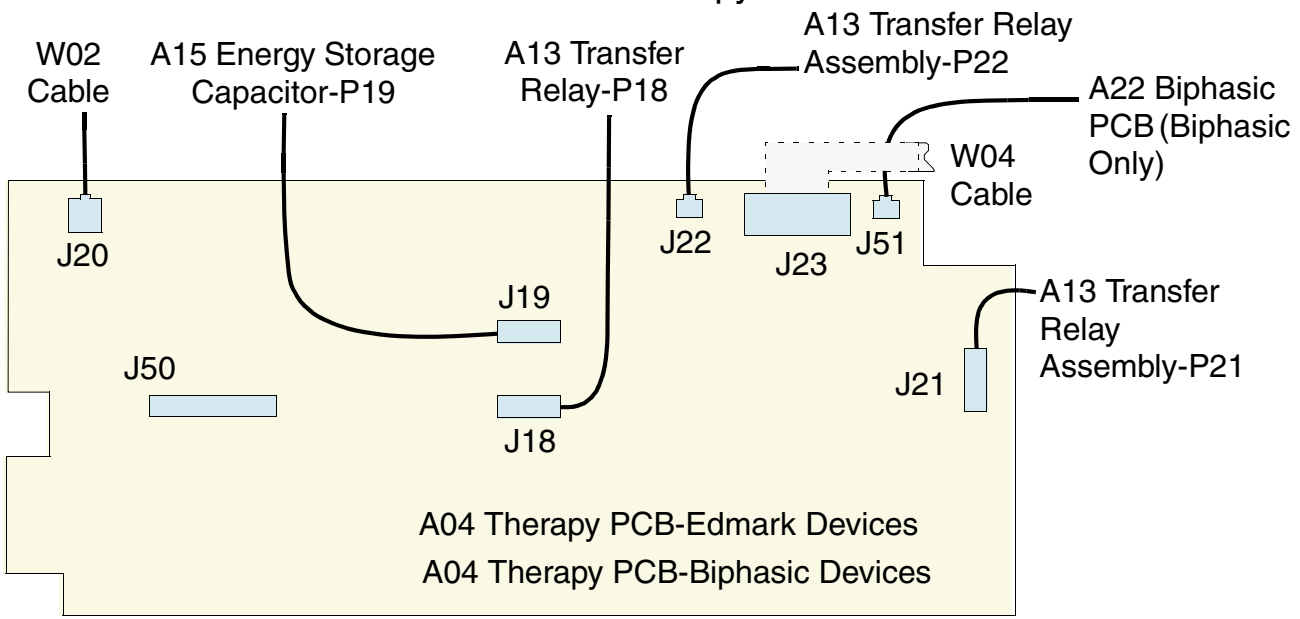
System/Memory/Therapy PCB Disassembly



4. Disconnect connectors on the A01 System PCB:
   - J01 – Compress the connector retaining clips and disconnect W01 Cable. The connector is blocked until the A01 System PCB is loosened.
   - J02 – Disconnect W04 Cable as part of the Case Disassembling procedure.
   - J04 – Lift the connector and disconnect W14 Cable.
   - J06 – Press the connector retaining clip (bottom of connector) and disconnect W07 ECG Connector Cable.
   - J07 – Press the connector retaining clip (bottom of connector) and disconnect the W33 IP Connector Cable.
5. Set the rear case upright and move the System/Memory/Therapy PCB device towards the front of the case to gain access to the rear Therapy PCB connectors.

System/Memory/Therapy PCB Disassembly

6. Disconnect six connectors on the Therapy PCB.



- J18 – Disconnect A13 Transfer Relay Assembly-P18.
- J19 – Disconnect A15 Energy Storage Capacitor-P19.
- J20 – Disconnect W02 Cable.
- J21 – Disconnect A13 Transfer Relay Assembly-P21.
- J22 – Disconnect A13 Transfer Relay Assembly-P22.
- J23 – (W04 Cable was disconnected during **Case Disassembly**).
- J51 – Disconnect A22 Biphasic PCB — Biphasic Devices only.

System/Memory/Therapy PCB Disassembly

7. Lift the System/Memory/Therapy PCB device from the case and place on a flat surface with the Therapy PCB face up.
8. Immediately complete the **Discharging the Pacing Capacitor** procedure.
9. Note orientation of the option shield (**144**) (if installed) and remove from the rear case.

To install the System/Memory/Therapy PCB device, reverse the above steps.

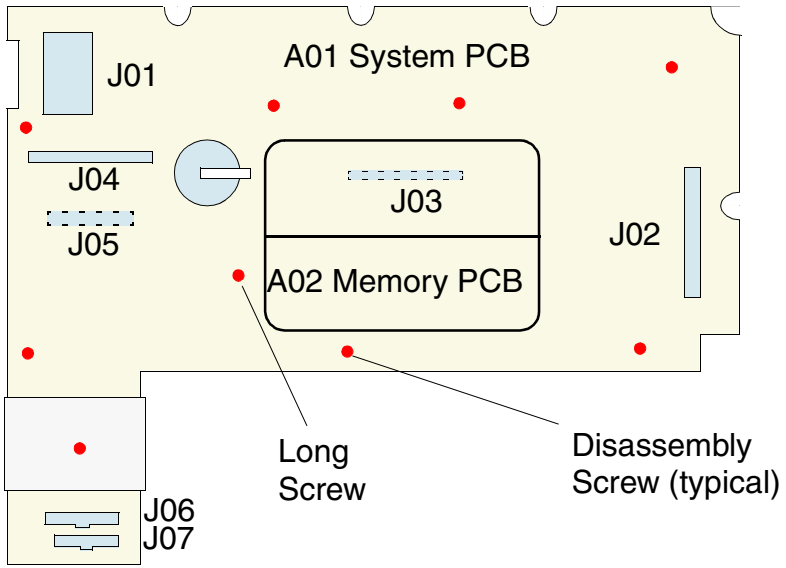
Note: Before attaching the six screws (**230**) that secure the System/Memory/Therapy PCB device in the rear case, connect the W01 Cable to A01 System PCB-J01.

For the next procedure, see **Summary of Replacement Procedures**.

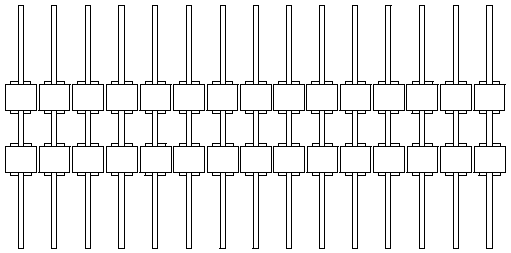
A01 System PCB Replacement

To remove the A01 System PCB (rear case):

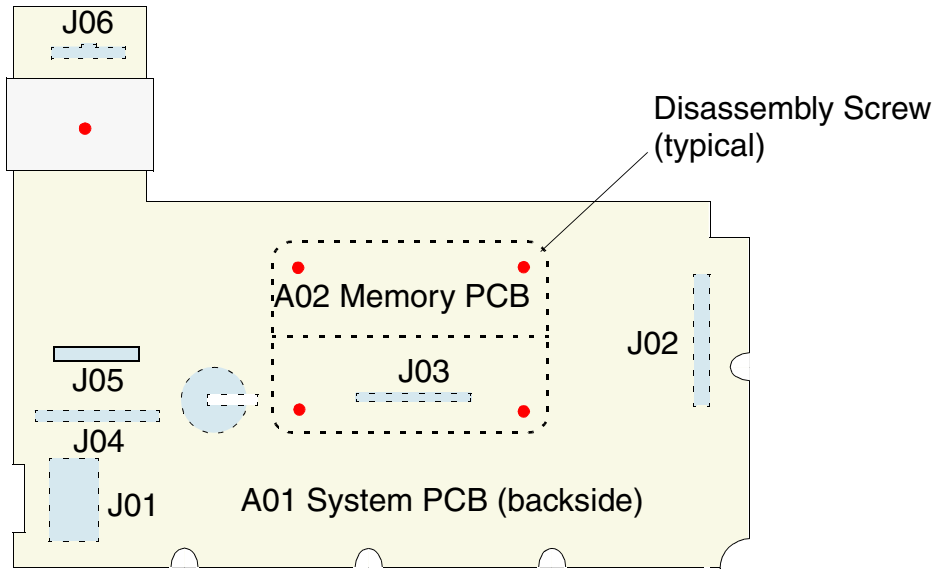
1. Complete the **Disassembling Case** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure.
3. Place the System/Memory/Therapy PCB device with A01 System PCB face up. Remove seven screws (**230**), and one long screw (**296**) and nut (**216**). Make sure you loosen the screws and not the screw posts.



A01 System PCB Replacement



4. Gently lift the A01 System PCB/A02 Memory PCB up and away from the Therapy PCB. The two PCBs are linked by the W03 Cable, which is a direct-connection contact assembly (see left).
5. Remove the W03 Cable, then place the Therapy PCB aside.
6. On the back of the A01 System PCB, remove the four screws (**230**) securing the CPU EMI Shield (**12**). Note orientation for later reassembly, then remove the shield.



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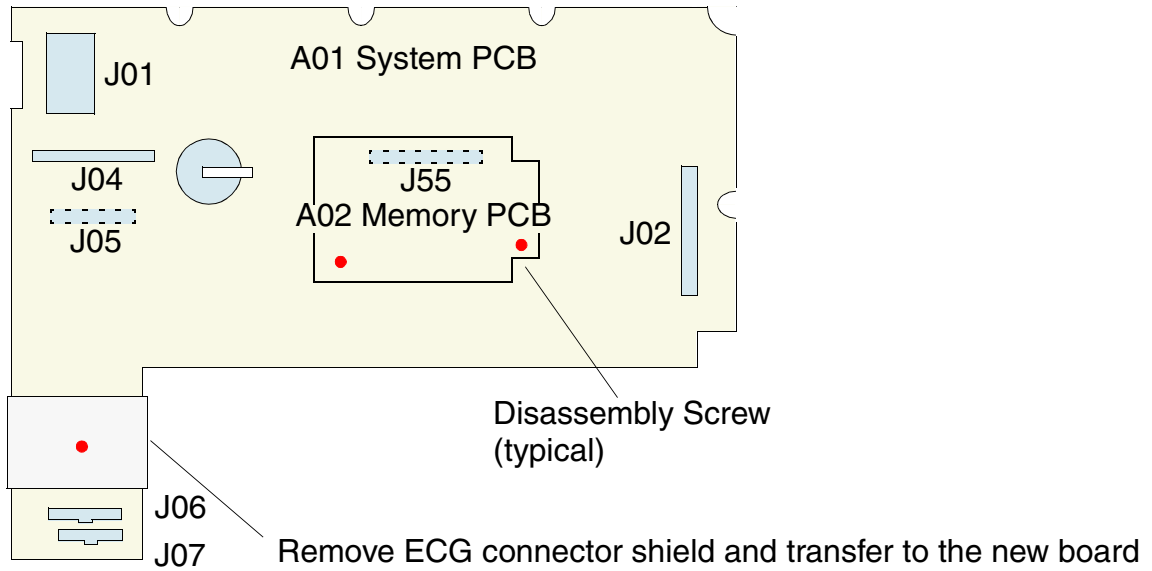
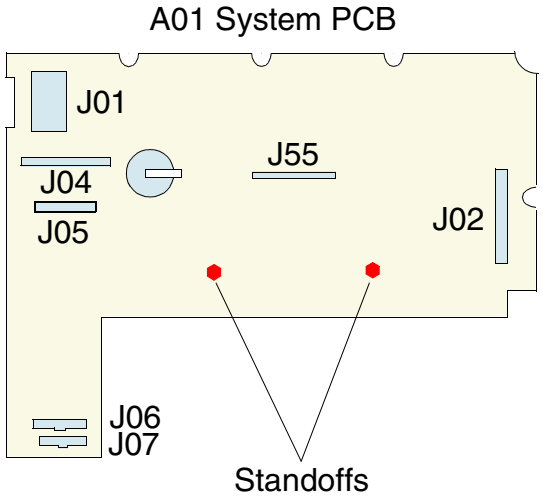
A01 System PCB Replacement

7. On the front of A01 System PCB, remove two screws (**230**) securing the A02 Memory PCB. Remove the A02 Memory PCB by lifting up and disconnecting A02 Memory PCB-J55 from A01 System PCB-J03.



A01 System PCB Replacement



8. Remove the A02 Memory PCB standoffs (**251**) and reuse on the new A01 System PCB.
9. Remove the ECG connector shield and reuse on the new A01 System PCB.

To install the A01 System PCB, reverse the above steps. Observe the following:

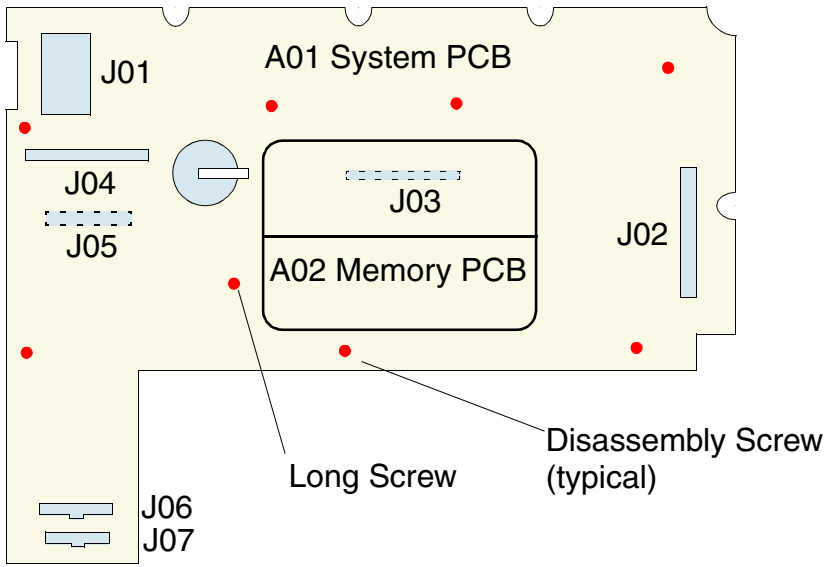
- Be sure you tighten both the screws and the nuts during reinstallation.
- After device reassembly, you must complete the **TCP – Computer-Assisted Energy Calibration** procedure, because the defibrillator calibration constants are invalidated when you replace the A01 System PCB.

For the next procedure, see **Summary of Replacement Procedures**.

A02 Memory PCB Replacement

To remove the A02 Memory PCB (rear case):

1. Complete the **Disassembling Case** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure.
3. Place the System/Memory/Therapy PCB device with A01 System PCB face up. Remove seven screws (**230**) and one long screw (**296**). Make sure you loosen the screws and not the screw posts.



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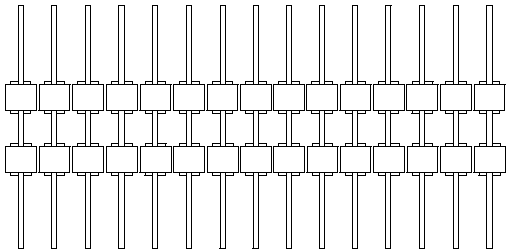
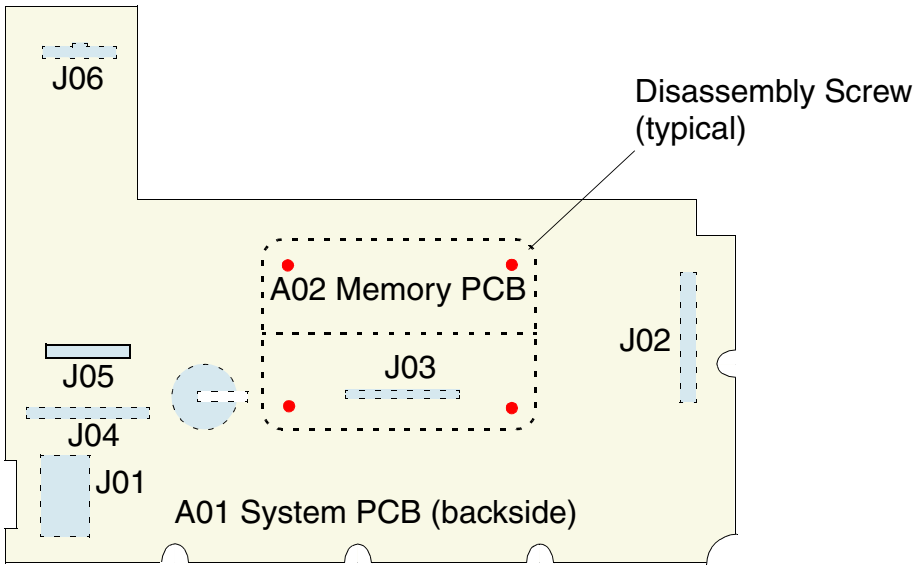
A02 Memory PCB Replacement



4. Gently lift the A01 System PCB/A02 Memory PCB up and away from the Therapy PCB. The two PCBs are linked by the W03 Connector, which is a direct-connection contact assembly (see diagram at left).
5. Remove the W03 Connector, then place the Therapy PCB aside.
6. On the back of the A01 System PCB, remove the four screws (**230**) securing the CPU EMI Shield (**12**). Note orientation for later reassembly, then remove the shield.



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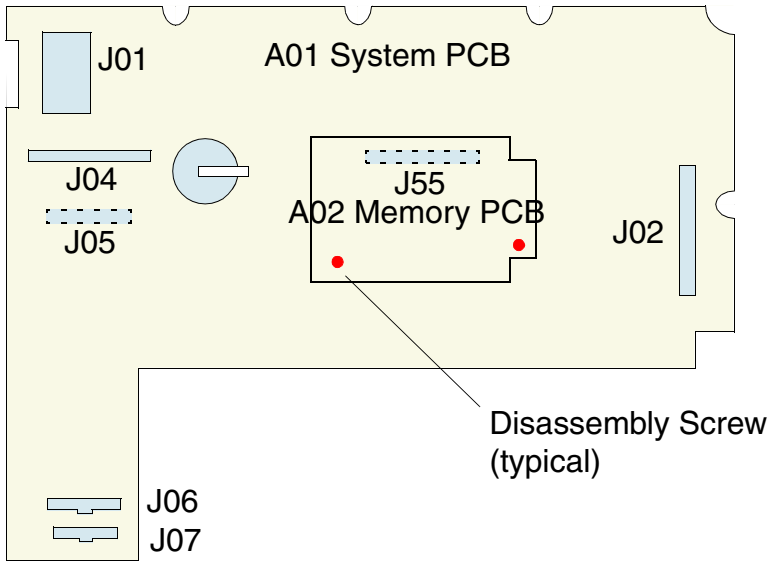
A02 Memory PCB Replacement

7. On the front of A01 System PCB, remove two screws (**230**) securing the A02 Memory PCB. Remove the A02 Memory PCB by lifting up and disconnecting A02 Memory PCB-J55 from A01 System PCB-J03.

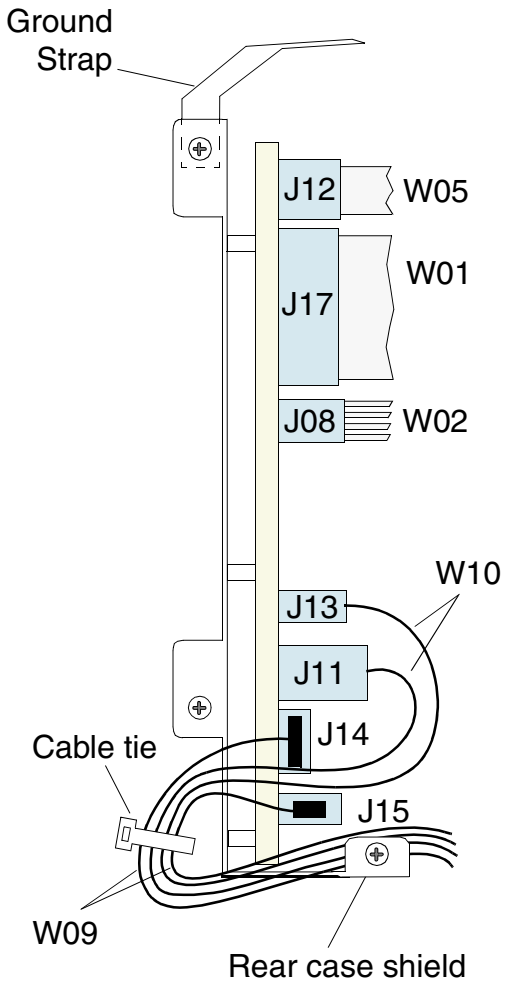


To install the A02 Memory PCB, reverse the previous steps.

Note: Be sure you tighten both screws and nuts during reinstallation.

For the next procedure, see **Summary of Replacement Procedures**.

A03 Power PCB Replacement

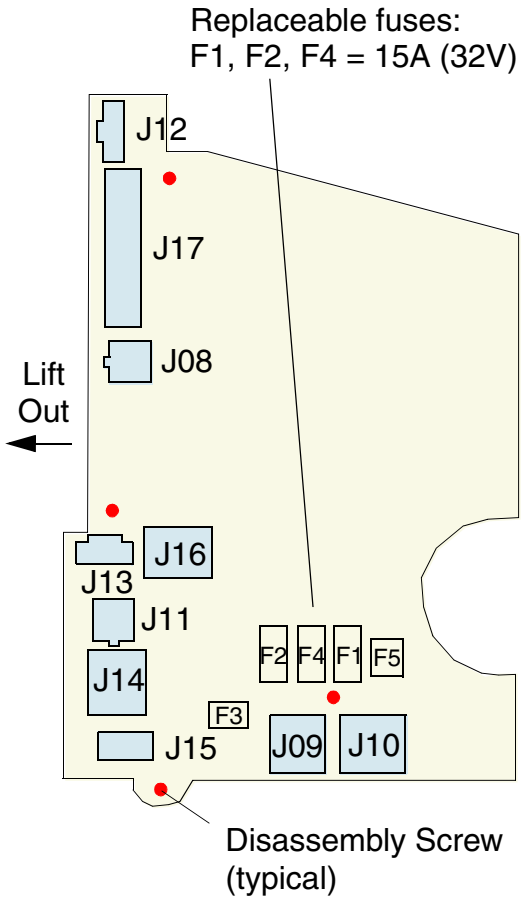


Some parts mentioned in these steps are optional parts and may not be a part of your device.

To remove the A03 Power PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Complete the **A06 OEM PCB Replacement**, beginning at steps 3 and on.
4. For orientation, locate the A03 Power PCB on the **Inside Rear Case**.
5. Complete the **A21 NIBP/A23 CO2 Module Disassembly**, steps 3 through 12 to:
   Remove the OEM PCB shield,
   Remove the capacitor bracket,
   Disconnect related cables and tubing,
   Disconnect the CO2 ground strap, and
   Remove the Foam Support Blocks with PCBs.
6. Cut the cable tie securing the W09 and W10 Cable wiring that connects to J11 and J13 (W10) and J14 and J15 (W09).

A03 Power PCB Replacement



7. Disconnect five connectors by pressing the associated retaining clips and disconnecting: J12 (W05 Cable), J13 and J11 (W10 Cable), and J14 and J15 (W09 Auxiliary Connector Cable). Cable W01 and Cable W02 were disconnected at the other end during the A06 OEM PCB removal.
8. Remove two screws (**230**) securing the A03 Power PCB bracket (**62**) to the PC Card bracket.
   - Devices with EtCO2: one screw to the PC Card bracket has a washer and ground strap (**370**) under it.
   - Devices without an A06 OEM PCB: remove one screw (**230**) securing the rear case shield (150).
9. Remove the bracket and PCB.
10. Disconnect two connectors by pressing the associated retaining clip and disconnecting: J09 and J10 (W08 System Connector Cable).
11. Remove four screws (**230**) securing the A03 Power PCB to the mounting bracket and remove the A03 Power PCB.

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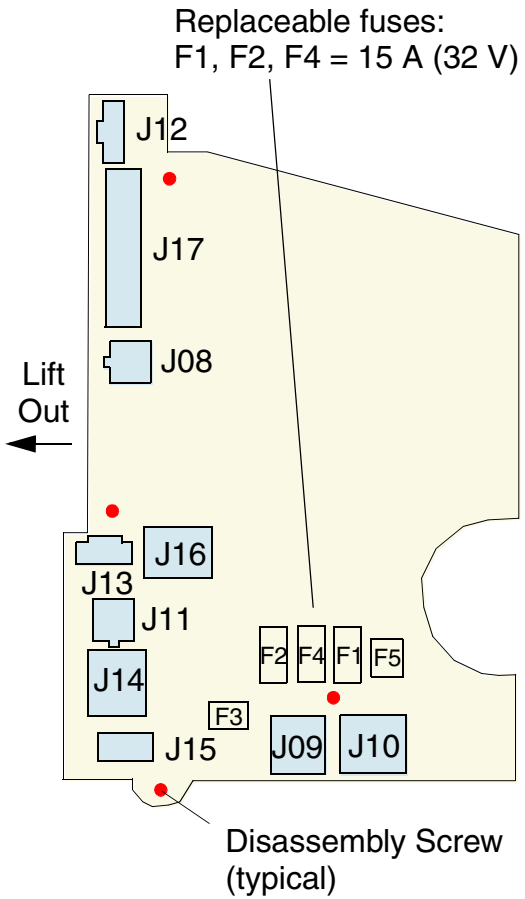
A03 Power PCB Replacement



To install the A03 Power PCB, reverse the previous steps. Observe the following:

1. Connect the W08 System Connector Cable to J09 and J10 before mounting the A03 Power PCB in the case.
2. Replace the cable tie (**222**) to group the W09 and W10 Cable wiring as shown.
3. If an A06 OEM PCB is not installed, the rear case shield (150) goes between the screw head and the bracket near J15. If an A06 OEM PCB is installed, the rear case shield goes between the A06 OEM PCB and the bracket.

For the next procedure, see **Summary of Replacement Procedures**, or return to **System PCB/PC Card Slot Cable.**

Fuse Replacement (F3 and F5 are not replaceable):

- F1 – 15A, 32 V. Protects the W08 Auxiliary Connector +18 Vdc output.
- F2 – 15A, 32 V. Protects the Battery 2 charging current.
- F4 – 15A, 32 V. Protects the Battery 1 charging current.

A03 Power PCB Replacement

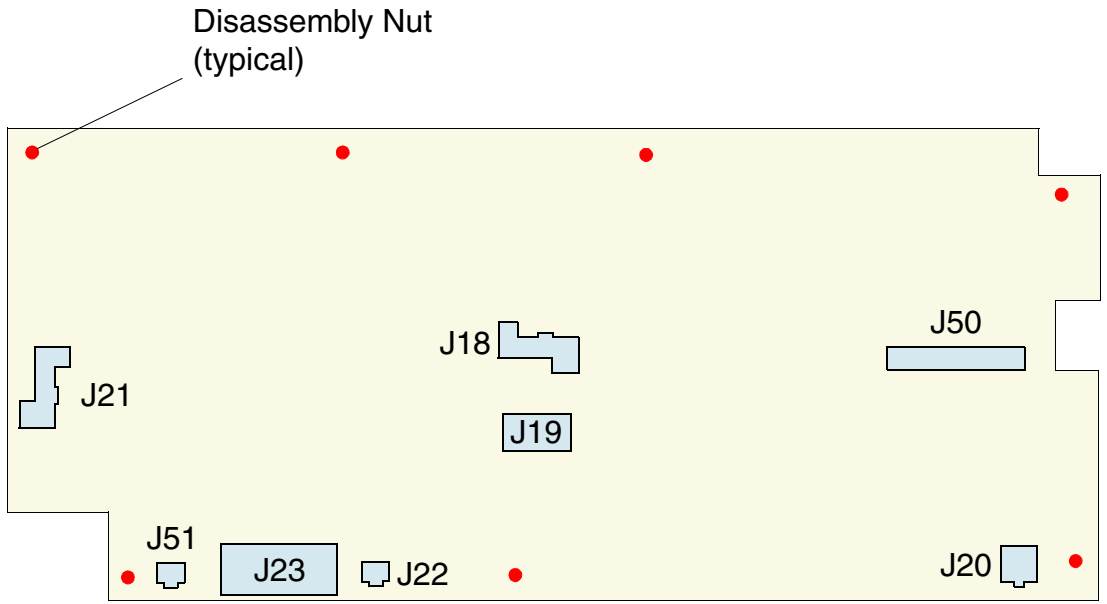
To replace an A03 Power PCB fuse:

1. **Remove the A03 Power PCB**.
2. Pull the old fuse straight out and away from fuse holder.
3. Push the new fuse (**F1**, **F2**, or **F4**) into the fuse holder.

A04 Therapy PCB Replacement—Edmark Devices

To remove the A04 Therapy PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, steps 2 and on.
3. Place the System/Memory/Therapy PCB device on a protective surface with A01 System PCB face down. Remove seven nuts (**216**). Make sure you loosen the nuts and not the screw posts.



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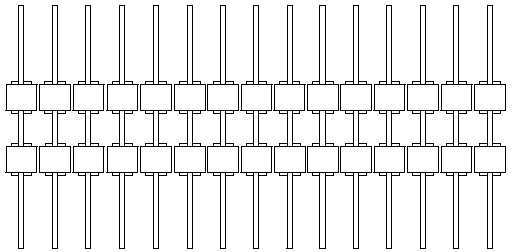
A04 Therapy PCB Replacement—Edmark Devices



4. Gently lift the A04 Therapy PCB up and away from the A01 System PCB. The two PCBs are linked by the W03 Connector, which is a direct-connection contact assembly (see diagram at left).
5. Remove the W03 Connector, if necessary, from the A04 Therapy PCB.
6. Lift the shield from the A04 Therapy PCB, and transfer to the new A04 Therapy PCB.

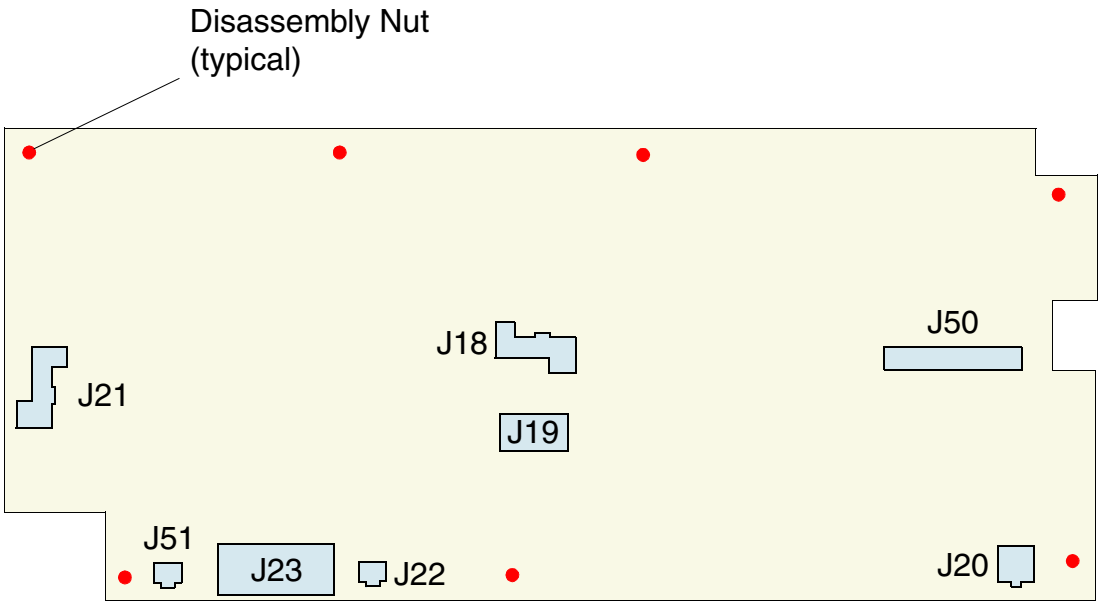
To install the A04 Therapy PCB, reverse the previous steps. Tighten both screws and nuts during reinstallation.

For the next procedure, see **Summary of Replacement Procedures**.

A04 Therapy PCB Replacement—Biphasic Devices

To remove the A04 Therapy PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, steps 2 and on.
3. Place the System/Memory/Therapy PCB device on a protective surface with A01 System PCB face down. Remove seven nuts (**216**). Make sure you loosen the nuts and not the screw posts.



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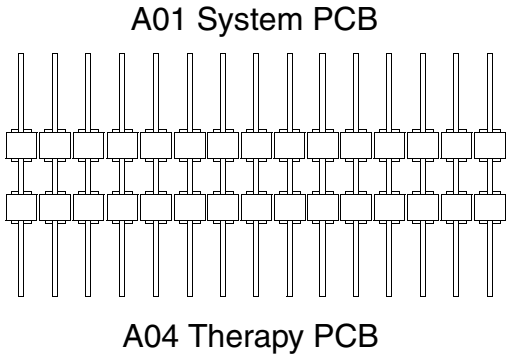
A04 Therapy PCB Replacement—Biphasic Devices

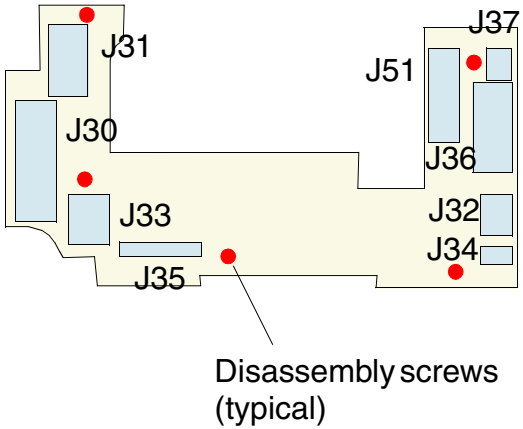


4. Gently lift the A04 Therapy PCB up and away from the A01 System PCB. The two PCBs are linked by the W03 Connector, which is a direct-connection contact assembly (see diagram at left).
5. Remove the W03 Connector if necessary, from the A04 Therapy PCB.
6. Lift the shield from the A04 Therapy PCB, and transfer to the new A04 Therapy PCB.

To install the A04 Therapy PCB, reverse the previous steps. Tighten both screws and nuts during reinstallation.

For the next procedure, see **Summary of Replacement Procedures**.

A05 Interface PCB Replacement



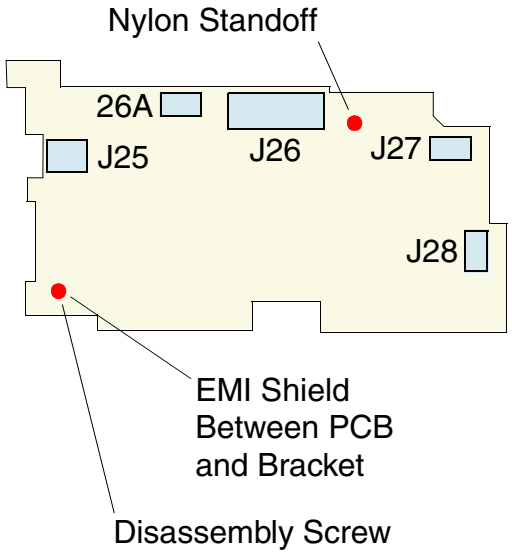
To remove the A05 Interface PCB (front case):

1. Complete the **Case Disassembly** procedure.
2. Locate the A05 Interface PCB on the **Inside Front Case** drawing.
3. Disconnect connectors (from top left, counterclockwise):
   - J31 - Compress the connector retaining clips and disconnect W13 Cable.
   - J30 - Compress the connector retaining clips and disconnect W04 Cable.
   - J33 - Press the connector retaining clip and disconnect W15 Selector.
   - J35 - Spread the connector retaining clips and eject W16 Cable.
   - J34 - Press the connector retaining clip and disconnect W17 Speaker.
   - J32 - Press the connector retaining clip and disconnect W12 Cable.
   - J36 (LCD) - Spread the connector retaining clips and eject W18 Cable.
   - J37 (LCD) - Press the connector retaining clip and disconnect W06 Cable.
   - J51 (EL) - Spread the connector retaining clips and eject W18 Cable.
4. Remove five screws (**230**).

To install the A05 Interface PCB, reverse the above steps. Make sure all the connector retaining clips are positioned to secure their respective connectors and no wires are pinched.

For the next procedure, see **Summary of Replacement Procedures**.

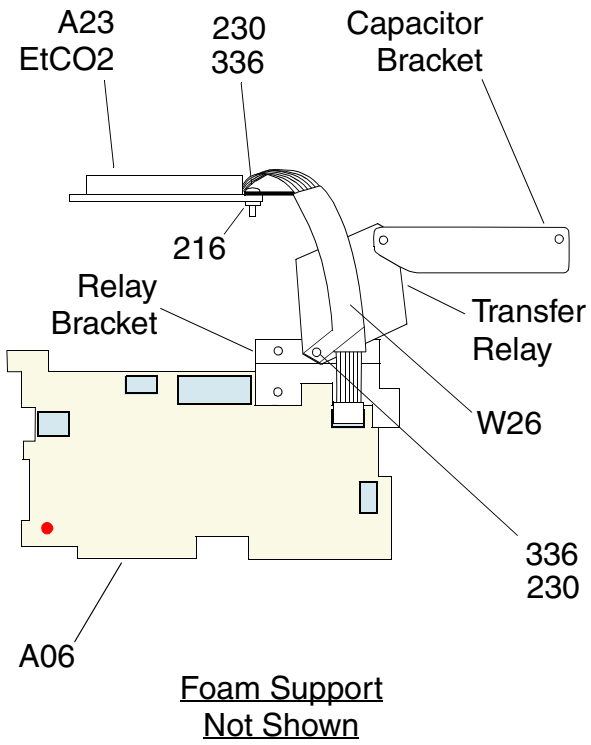
A06 OEM PCB Replacement



To remove the A06 OEM PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure.
3. For orientation, locate the A06 OEM PCB on the **Inside Rear Case** drawing.
4. Remove the option shield (**144**).
5. Remove the metal retaining clip (**226**) and disconnect P26 of the **W21 Cable** from A06 OEM PCB-J26A.
6. Remove the retaining clip and disconnect ribbon cable W27 from A06 OEM PCB-J28.
7. Remove the retaining clip and disconnect cable W26 from the A06 OEM PCB-J27.
8. Remove the nylon hex standoff (**248**) next to J26 and one screw (**230**), lower left corner.
9. Move the A06 OEM PCB to the right (toward the capacitor) to disengage the direct connection between A06 OEM PCB-J25 and A03 Power PCB-J16. Remove the PCB.

A06 OEM PCB Replacement



To install the A06 OEM PCB, reverse the above steps. Be sure the EMI shield (**150**) is between the A06 OEM PCB and mounting bracket. Also lift the tab at the upper left corner of the A06 OEM PCB over the ground clip on the power bracket, and then press down on the tab while sliding the A06 OEM PCB to the left to engage the connection to the A03 Power PCB-J16.

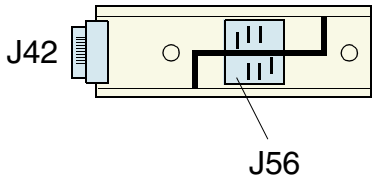
Note: When installing the A06 OEM PCB, ensure that the option shield (**144**) partially covers the W01 System Cable to minimize wear.

For the next procedure, see **Summary of Replacement Procedures,** or

Return to:

Power PCB	**Rear Case Replacement—Edmark**
CO2 Connector Removal	**Rear Case Replacement—Biphasic**
NIBP/CO2 Module Disassembly	**Battery Pins/Power PCB Cable—Edmark**
	Battery Pins/Power PCB Cable—Biphasic

A07 Smart Contact PCB Replacement



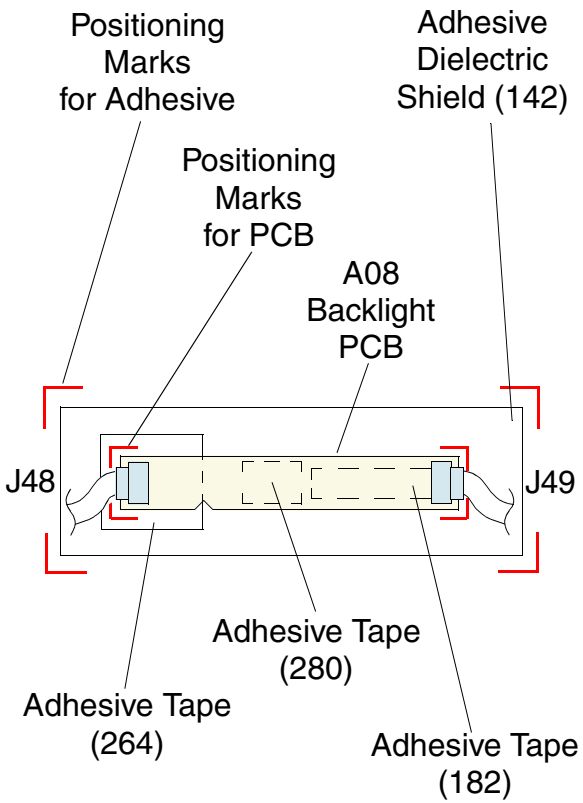
To remove the A07 Smart Contact PCB (from outside the rear case):

1. Lay the device face down on a static-free, non-abrasive surface.
2. Remove two screws (**232**) from the Battery Retainer (**24**) between the battery wells. Lift away the Battery Retainer. For devices with EtCO2, unplug W31 exhaust tubing. Do not let the exhaust tubing fall inside the case.
3. Pull the A07 Smart Contact PCB away from the case and disconnect the W05 Cable at J42. Tape or otherwise restrain the W05 Cable so it does not disappear inside the case. (J56 is the edge connector for a LIFEPAK SLA battery.)

To install, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**, or return to **Power PCB/Contact PCB Cable.**

A08 Backlight PCB Replacement—LCD Devices Only



To remove the A08 Backlight PCB (front case):

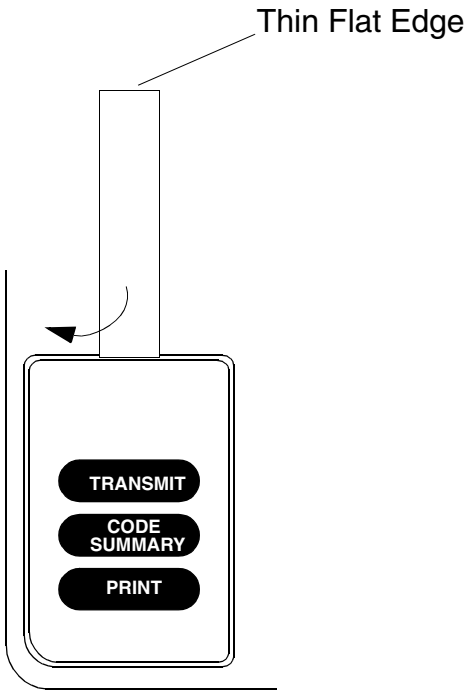
1. Complete the **Case Disassembly** procedure.
2. For orientation, locate A08 Backlight PCB on the **Inside Front Case** drawing.
3. Disconnect the **W06 Cable** at A08 Backlight PCB-J49.
4. Disconnect A11 LCD Assembly-P48 from A08 Backlight PCB-J48.
5. Gently pry and lift the A08 Backlight PCB off the adhesive strip. Do not damage the underlaying adhesive shield (**142**).

To install the A08 Backlight PCB:

1. Using a soft, lint-free cloth and isopropyl alcohol, gently remove old adhesive from the adhesive shield (**142**).
2. Apply adhesive tape (**264**) to adhesive dielectric shield (**142**).
3. Apply new PCB adhesive tape (**182** and **280**) to the A08 Backlight PCB.
4. Apply the A08 Backlight PCB between the inside set of positioning marks.
5. Reconnect A11 LCD Assembly-P48 to A08 Backlight PCB-J48.
6. Reinstall **W06 Cable**.

For the next procedure, see **Summary of Replacement Procedures**, or return to **Front Case Metal Shield.**

A09 Small Keypad Replacement



To remove the A09 Small Keypad (from outside the front case):

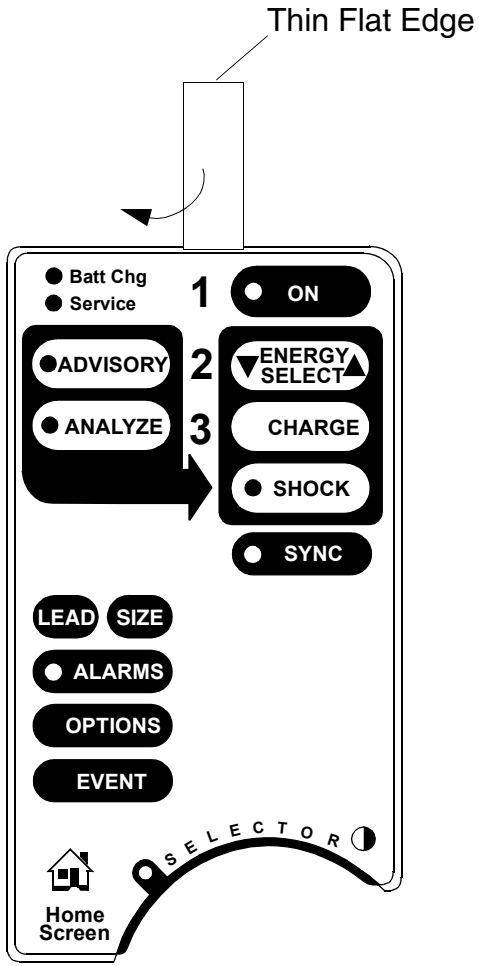
1. Using a very thin, flat-edge tool, gently pry one edge of the A09 Small Keypad until it is released from its adhesive mount. **Do not damage the case**.
2. Pull the A09 Small Keypad away from the case, extending part of the W12 Cable through the keypad opening.
3. Disconnect the W12 Cable from A09 Small Keypad-J41. Make sure the W12 Cable does not fall back into the front case.
4. Using a soft, lint-free cloth and isopropyl alcohol, gently remove old adhesive from the A09 Small Keypad cavity on the front case.

Note: Before installing the new A09 Small Keypad, verify that the shelf life date printed on the A09 Small Keypad package has not expired.

To install the A09 Small Keypad, reverse the above steps. After you remove the protective covering from the keypad adhesive surface, press the keypad firmly and evenly into the keypad cavity on the front case.

For the next procedure, see **Summary of Replacement Procedures**.

A10 Large Keypad Replacement



453

Standard Configuration Shown

To remove the A10 Large Keypad (from outside the front case):

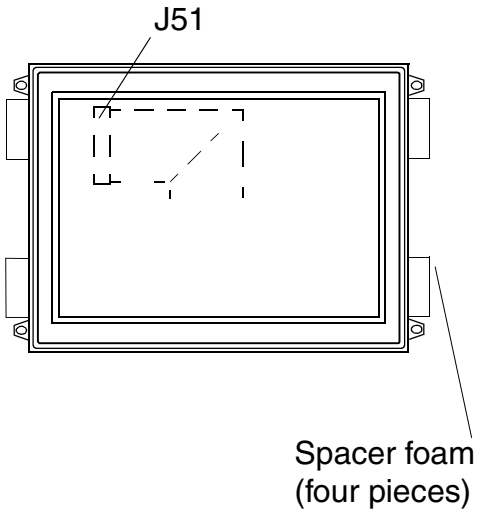
1. Using a wide, very thin, flat-edge tool, gently pry one edge of the A10 Large Keypad until it is released from its adhesive mount. **Do not damage the case.**
2. Pull the A10 Large Keypad away from the case, extending part of the W13 Cable through the keypad opening.
3. Disconnect the W13 Cable from A10 Large Keypad-J39. Make sure the W13 Cable does not fall back into the front case.
4. Using a soft, lint-free cloth and isopropyl alcohol, gently remove old adhesive from the A10 Large Keypad cavity on the front case.

Note: Before installing the new A10 Large Keypad, verify that the shelf life date printed on the A10 Large Keypad package has not expired.

To install the A10 Large Keypad, reverse the above steps. After you remove the protective covering from the keypad adhesive surface, press the keypad firmly and evenly into the keypad cavity on the front case.

For the next procedure, see **Summary of Replacement Procedures**.

A11 EL Display Assembly Replacement



To remove the A11 EL Display Assembly (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the A11 EL Display Assembly-P51 connection on the **Inside Front Case** drawing.

   Note: The lens surface is very fragile, will absorb oils from being touched, and can be scratched easily. Remove fingerprints with a lint-free cloth.

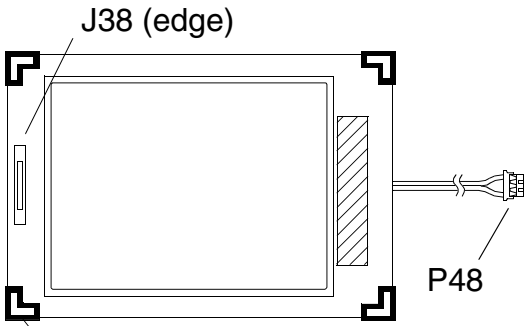
3. Remove the **A05 Interface PCB**. Remove four screws (**230**). Lift the A11 EL Display Assembly gently away from the front case by lifting up on the corner screw tabs. Remove four screws to separate the EL Display from its bracket.

To install the A11 EL Display Assembly, reverse the above steps. Observe the following:

- Be sure that both the A11 EL Display Assembly screen and the A11 EL Display Assembly Lens are completely clean and dust free before reinstalling.
- Be sure you orient the A11 EL Display Assembly correctly in the front case, with the ribbon cable folded 90°, oriented toward J51 on the Interface PCB.
- Remember, the lower-left metal shield screw secures the W19 Cable eyelet.

For the next procedure, see **Summary of Replacement Procedures**.

A11 LCD Assembly Replacement



Black rubber corner shock mounts with the raised portions facing away from the lens.

To remove the A11 LCD Assembly (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the A11 LCD Assembly-P48 and A11 LCD Assembly-J38 connections on the **Inside Front Case** drawing.
3. Conduct the **Front Case Metal Shield Disassembly** procedure.

   Note: The lens surface is very fragile, will absorb oils from being touched, and can be scratched easily. Remove fingerprints with a lint-free cloth.

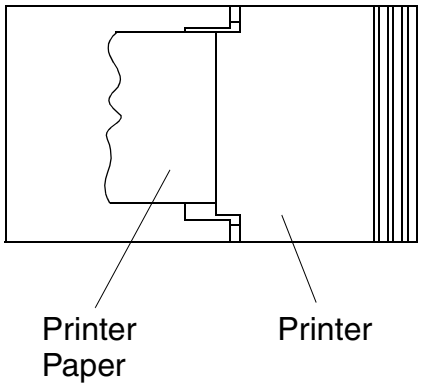
4. Lift the A11 LCD Assembly gently away from the front case by lifting up on the black rubber corner shock mounts (**6**).

To install the A11 LCD Assembly, reverse the above steps. Observe the following:

- Be sure that both the A11 LCD Assembly screen and the A11 LCD Assembly Lens are completely clean and dust free before reinstalling.
- Be sure you orient the A11 LCD Assembly correctly in the front case, with the ribbon cable on the right and two-lead cable on the left.
- Remember, the lower-left metal shield screw secures the W19 Cable eyelet.

For the next procedure, see **Summary of Replacement Procedures**.

A12 Printer Assembly (50 mm) Replacement



Note: For **A12 Printer Assembly (100 mm) Replacement**, see the next heading.

To remove the A12 Printer Assembly (50 mm) (from outside the front case):

1. Lay the device face up on the battery wells.
2. Remove the printer paper.
3. Remove the two screws (**232**) from inside the A12 Printer Assembly.

Note: Some defibrillators use two lock washers in addition to the two screws (A12 Printer Assembly (50 mm) PN 804189-02).

4. Gently lift the A12 Printer Assembly edge (on the speaker side) up and toward the speaker to disengage the printer connector.
5. Record the printhead resistance displayed on the printer label (near the motor). An example of this information is "R=720".

A12 Printer Assembly (50 mm) Replacement

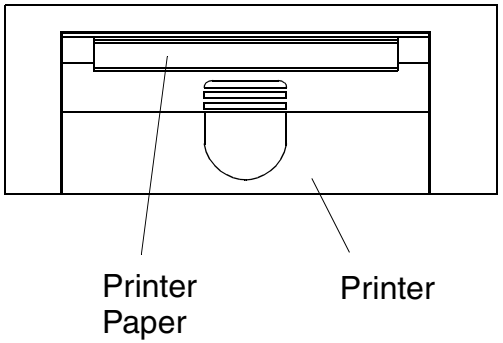
To install the A12 Printer Assembly, reverse the above steps. After reassembly, complete the **TCP – Printer Calibration** procedure.

Note: The A12 Printer (50 mm) can be disassembled and repaired. See **A12 Printer (50 mm) Repair Procedures**.

Note: The device software is configured for a specific type of printer. Therefore, the 50 mm and 100 mm printers are not interchangeable.

For the next procedure, see **Summary of Replacement Procedures**.

A12 Printer Assembly (100 mm) Replacement



Note: For **A12 Printer Assembly (50 mm) Replacement**, see the previous heading.

To remove the A12 Printer Assembly (100 mm) (from outside the front case):

1. Lay the device face up on the battery wells.
2. Remove the printer paper.
3. From the front side, remove the two screws from inside the A12 Printer Assembly.
4. Gently lift the A12 Printer Assembly (on the speaker side) and lift up and over toward the speaker to disengage the printer connector.
5. On the new printer, look at the top metal bracket, near the motor, for the value of the printhead resistance. For example, R=1181. Write this on a piece of paper, and, after printer installation, place inside the printer for future reference. Specifically, the printhead resistance value is used when completing the **TCP – Printer Calibration**.

A12 Printer Assembly (100 mm) Replacement

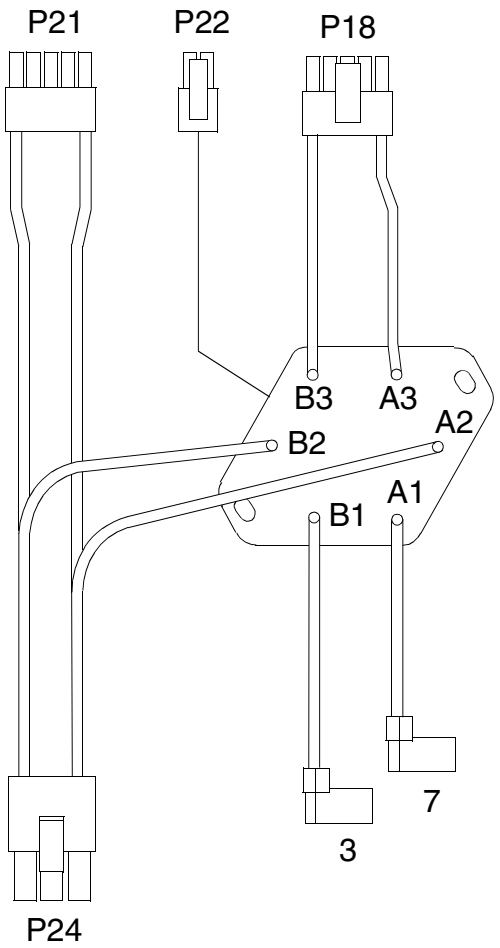
To install the A12 Printer Assembly, reverse the steps on the previous page.

Note: The new printer comes with new screws installed to aid reassembly.

Note: The A12 printer (100 mm) can be repaired (in a limited fashion). See **A12 Printer (100 mm) repair procedures**.

Note: The device software is configured for a specific type of printer. Therefore, the 50 mm and 100 mm printers are not interchangeable.

A13 Transfer Relay Assembly Replacement—Edmark Devices



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To remove the A13 Transfer Relay Assembly (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, steps 2 and on.
3. For orientation, locate the A13 Transfer Relay Assembly on the **Inside Rear Case** drawing.
4. Remove two screws (**230**) securing the capacitor bracket (**60**).
5. Cut the cable ties that secure the A13 Transfer Relay Assembly wiring.
6. Remove one screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
7. Remove two spade terminals from A17 Interconnect Bracket terminals 3 and 7.
8. Note the orientation of the P22 wiring for reinstallation, then remove the A13 Transfer Relay Assembly.

A13 Transfer Relay Assembly Replacement—Edmark Devices

To install the A13 Transfer Relay Assembly, reverse the previous steps. Observe the following:

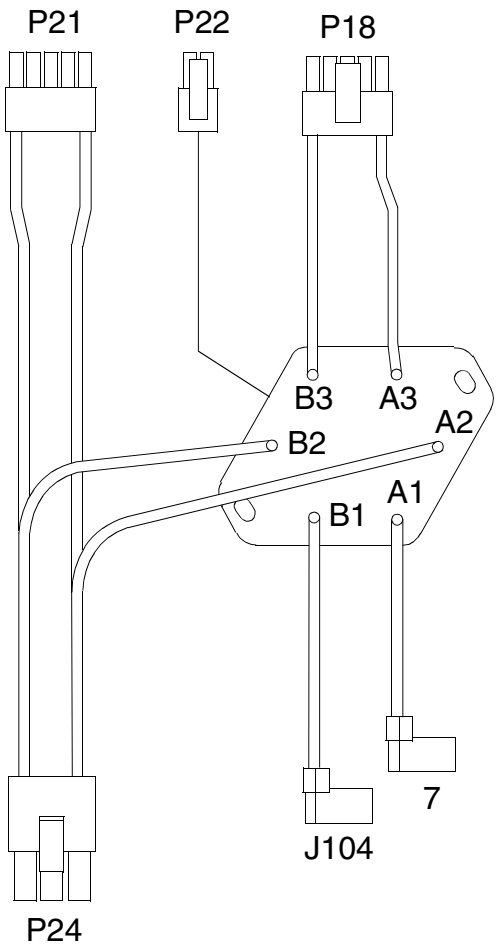
- The coil end of the A13 Transfer Relay Assembly fits in a recess in the case.
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing** for cable tie locations.
- After device reassembly, you must complete the **TCP – Energy Calibration** procedure because the defibrillator calibration constants are invalidated when you replace the A13 Transfer Relay Assembly.

For the next procedure, see **Summary of Replacement Procedures**, or

Return-to:

Rear Case Replacement	**Battery Pins/Power PCB Cable**

A13 Transfer Relay Assembly Replacement—Biphasic Devices



462

To remove the A13 Transfer Relay Assembly (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, steps 2 and on.
3. For orientation, locate the A13 Transfer Relay Assembly on the **Inside Rear Case** drawing.
4. Remove two screws (**230**) securing the capacitor bracket (**60**).
5. Cut the cable ties that secure the A13 Transfer Relay Assembly wiring.
6. Remove one screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
7. Remove spade terminals at A17 Interconnect Bracket positions 3, 6, 7, and 9.
8. Remove two screws (**230**) securing the A22 Biphasic PCB bracket (**324**) to the rear case.
9. Partially lift the A22 Biphasic PCB bracket and remove spade terminal connection J104. Remove the PCB and bracket from the case.
10. Note the orientation of the P22 wiring for reinstallation, then remove the A13 Transfer Relay Assembly.

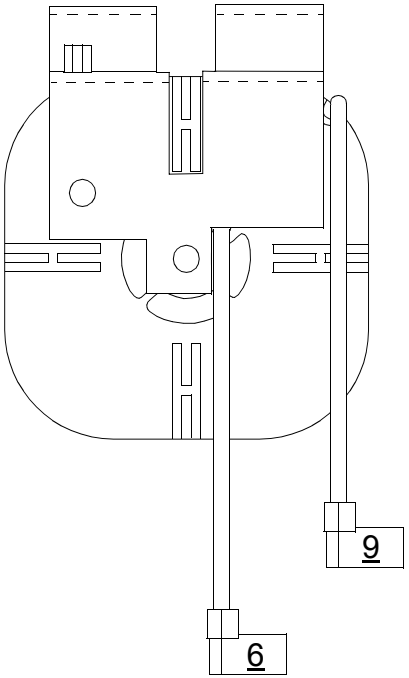
A13 Transfer Relay Assembly Replacement—Biphasic Devices

To install the A13 Transfer Relay Assembly reverse the previous steps. Observe the following:

- The coil end of the A13 Transfer Relay Assembly fits in a recess in the case.
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing** for cable tie locations.
- After device reassembly, you must complete the **TCP – Energy Calibration** procedure because the defibrillator calibration constants are invalidated when you replace the A13 Transfer Relay Assembly.

For the next procedure, see **Summary of Replacement Procedures**, or return to **Rear Case Replacement.**

A14 Waveshaping Inductor Replacement—Edmark Devices



To remove the A14 Waveshaping Inductor (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, steps 2 and on.
3. Locate the A14 Waveshaping Inductor on the **Inside Rear Case** drawing.
4. Remove one screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
5. Cut the cable tie (**222**) that secures the A14 Waveshaping Inductor wiring.
6. Remove the two spade lug connections from the A14 Waveshaping Inductor to the A17 Interconnect Bracket terminals 6 and 9. A gripping tool may be necessary.
7. Remove two screws (**230**) securing the A14 Waveshaping Inductor to the rear case, then remove the A14 Waveshaping Inductor with bracket.
8. Remove one screw (**230**) securing the inductor to the bracket (**52**).

A14 Waveshaping Inductor Replacement—Edmark Devices

To install the A14 Waveshaping Inductor, reverse the previous steps. Observe the following:

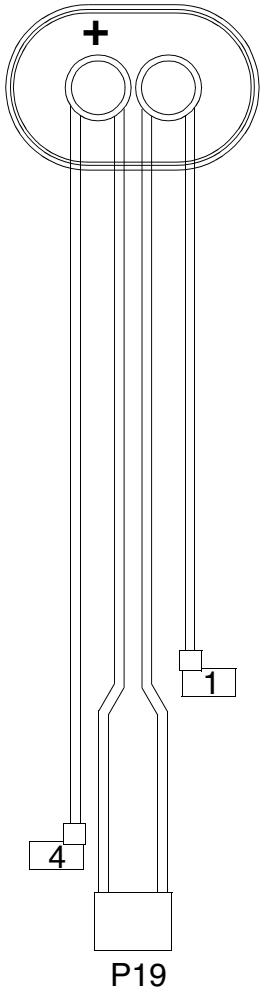
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing**, as required.
- After device reassembly, you must complete the **TCP – Energy Calibration** procedure, because the defibrillator calibration constants are invalidated when you replace the A14 Waveshaping Inductor Assembly.

For the next procedure, see **Summary of Replacement Procedures**, or

Return-to:

Rear Case Replacement	**Battery Pins/Power PCB Cable**

A15 Energy Storage Capacitor Replacement—Edmark Devices



466

To remove the A15 Energy Storage Capacitor (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly**, steps 2 and on.
3. Locate the A15 Energy Storage Capacitor on the **Inside Rear Case** drawing.
4. Remove two screws (**230**) securing the capacitor bracket (**60**).
5. Cut the cable ties (**222**) that secure the capacitor wiring.
6. Remove one screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
7. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
8. Observe orientation, then cut the large tie wrap (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.

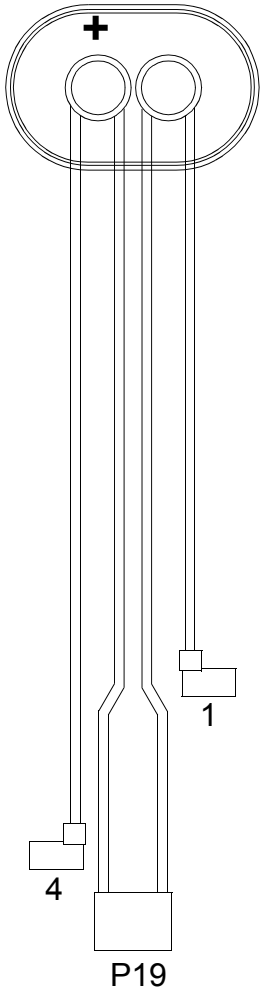
A15 Energy Storage Capacitor Replacement—Edmark Devices

To install the A15 Energy Storage Capacitor, reverse the above steps. Observe the following:

- Transfer the shields from the old capacitor to the new capacitor.
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing** for cable tie locations.

For the next procedure, see **Summary of Replacement Procedures**, or return to **Battery Pins/Power PCB Cable.**

A15 Energy Storage Capacitor Replacement—Biphasic Devices



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To remove the A15 Energy Storage Capacitor (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly**, beginning at step 2.
3. Locate the A15 Energy Storage Capacitor on the **Inside Rear Case** drawing.
4. Remove two screws (**230**) securing the capacitor bracket (**60**).
5. Cut the cable ties (**222**) that secure the capacitor wiring.
6. Remove one screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
7. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
8. Remove two screws (**230**) securing the A22 Biphasic PCB bracket (**324**) to the rear case.
9. Partially lift the A22 Biphasic PCB bracket and remove spade terminal connection J104. Remove the PCB with bracket.
10. Observe orientation, then cut the large tie wrap (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.

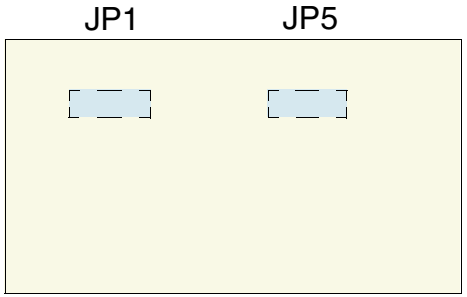
A15 Energy Storage Capacitor Replacement—Biphasic Devices

To install the A15 Energy Storage Capacitor, reverse the above steps. Observe the following:

- Transfer the shields from the old capacitor to the new capacitor.
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing** for cable tie locations.

For the next procedure, see **Summary of Replacement Procedures**.

A16 SpO2 PCB Replacement



To remove the A16 SpO2 PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Complete the **A06 OEM PCB Replacement** beginning at step 3.
4. For orientation, see **Inside Rear Case**.

   Remove the OEM PCB Shield (**384**).
5. Remove two screws (**230**) securing the capacitor bracket (**60**). Remove bracket.
6. Move the relay out of the way.
7. Remove two screws (**230**) securing the relay bracket (**46**) to the case. Remove bracket.
8. Remove the retaining clip (**226**) and disconnect the W22 Cable from the A16 SpO2 PCB-JP1. (Cable W21 at JP5 was disconnected at the other end during A06 OEM removal.)

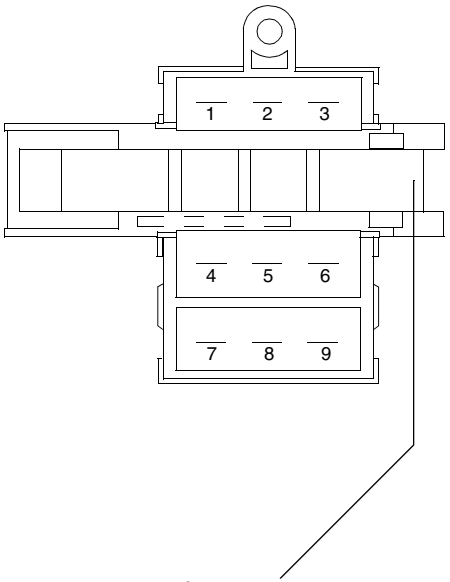
A16 SpO2 PCB Replacement

9. Remove the Upper Foam Support (**22**).
10. Lift out the A16 SpO2 PCB.

To install the A16 SpO2 Module, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

A17 Interconnect Bracket Replacement



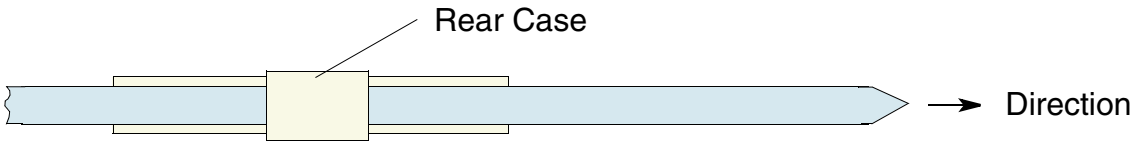
To remove the A17 Interconnect Bracket (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly**, beginning at step 2.
3. Locate the A17 Interconnect Bracket on the **Inside Rear Case** drawing.
4. Remove two screws (**230**) securing the capacitor bracket.
5. Remove one screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
6. Cut the cable ties (**222**) that secure the A17 Interconnect Bracket wiring.
7. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
8. Cut the large tie wrap (**224**) securing the A17 Interconnect Bracket.

A17 Interconnect Bracket Replacement

To install the A17 Interconnect Bracket, reverse the above steps. Observe the following:

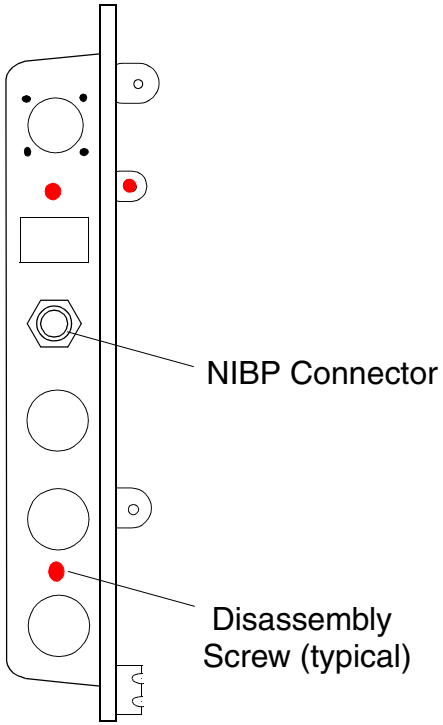
1. Feed the large tie through the left hole of the bracket, then the rear case, then the right hole of the bracket. Tighten so the tie collar fits in the bracket recess.



2. Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
3. See the **Energy Transfer Detail Drawing for Biphasic** or **Energy Transfer Detail Drawing for Edmark** for cable tie locations.

For the next procedure, see **Summary of Replacement Procedures**.

NIBP Connector Removal



To remove the NIBP Connector (Parameter Bezel):

Note: These steps include the A06 OEM PCB and all options on the Parameter Bezel. Your device may not have some of these options.

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Complete the **A06 OEM PCB Replacement** steps 3 and on.
4. Complete the **Parameter Bezel Removal** steps 2 and on.
5. Remove NIBP tube (**378**) from the NIBP Connector (**346**).

Note: If the NIBP tube has been disconnected/reconnected from the fitting once or twice in the past, the tube end should be trimmed to maintain an airtight seal.

6. Remove fitting nut on the back side of the bezel to remove connector (**346**) and seal (**348**).

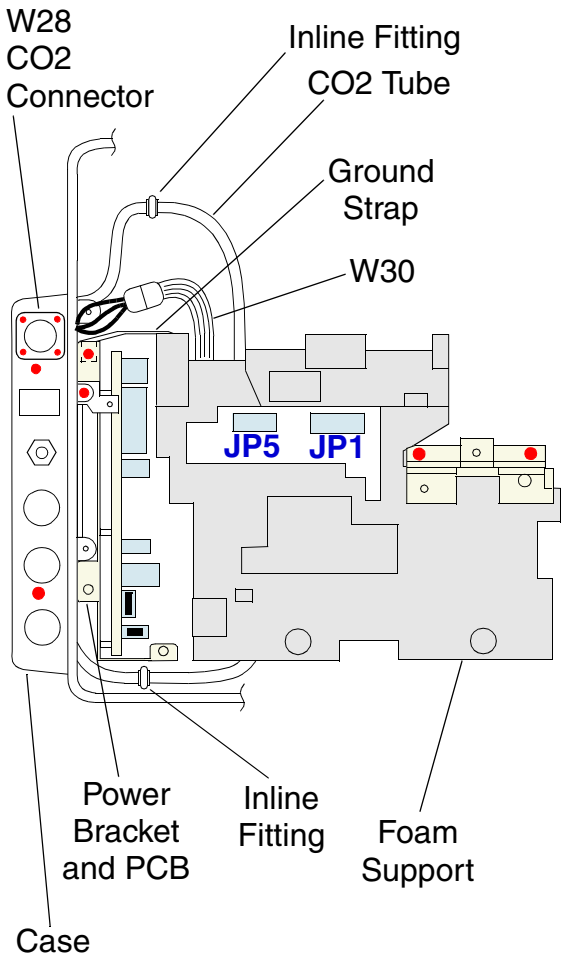
NIBP Connector Removal

To install the new NIBP Connector, reverse the steps above and observe the following:

1. Apply Parameter Bezel Label (**158**) to the new bezel front prior to installing the Cover (**356**) onto the CO2 Adapter.

For the next procedure, see **Summary of Replacement Procedures**.

A21 NIBP/A23 CO2 Module Disassembly



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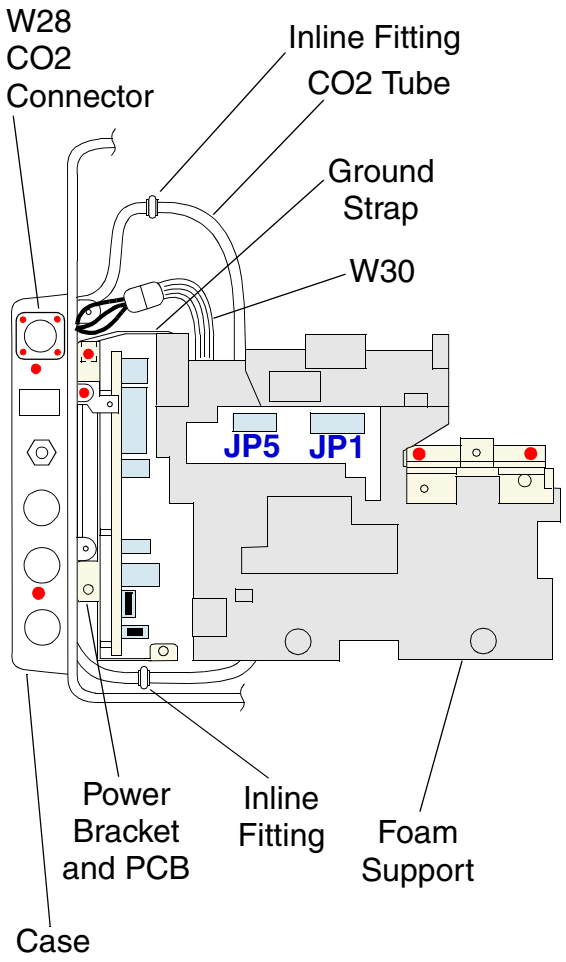
The A21 NIBP, A23 CO2, and A16 SpO2 PCBs are sandwiched between the Lower Foam Support (**20**) and Upper Foam Support (**22**). Some devices may not have all of these options.

Note: The CO2 Connector must be replaced with the PCB. See **W28 CO2 Connector Removal.**

To remove the A21 NIBP and A23 CO2 PCBs as a device (with the A16 SpO2 PCB):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Complete the **A06 OEM PCB Replacement** steps 3 and on.
4. For orientation see the **Inside Rear Case** Page 2 of 3.
5. Remove the OEM PCB Shield (**384**).
6. Remove two screws (**230**) securing the capacitor bracket (**60**). Remove the bracket.
7. Move the relay out of the way.
8. Remove two screws (**230**) securing the relay bracket (**46**). Remove the bracket.

A21 NIBP/A23 CO2 Module Disassembly



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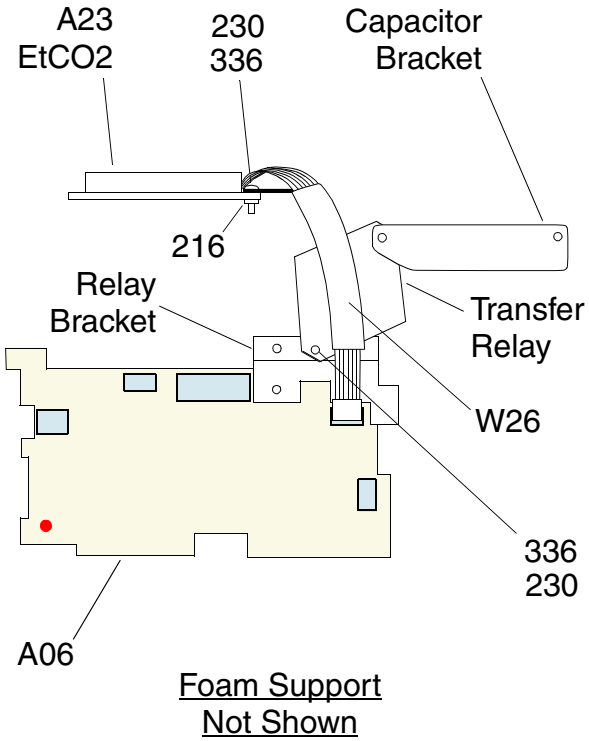
9. Remove the metal retaining clip (**226**) and disconnect the W22 SpO2 Connector Cable at A16 SpO2 Module-JP1. (Cable W21 at JP5 was disconnected at the other end during A06 OEM removal.)
10. Lift the Upper Foam Support off the Lower Foam Support.
11. Disconnect the NIBP PCB tube (**378**) at the barbed inline fitting. (Ribbon cable W27 at J2 was disconnected at the other end during A06 OEM removal.)
12. Disconnect the CO2 connector cable (coming from the bezel) from Adapter Cable W30.
13. Remove the CO2 tube (coming from the bezel) from the routing clip, then disconnect it from CO2 jumper tube at the barbed inline fitting. (Ribbon cable W26 at J4 was disconnected at the other end during A06 OEM removal.)
14. Remove one screw (**230**) from the power bracket to free the ground strap (**370**) that is attached to the CO2 PCB.
15. Lift the Lower Foam Support and PCBs out of the case as a device far enough to unplug the black CO2 exhaust tube from the back of the case at the battery retainer. Lift out.

A21 NIBP/A23 CO2 Module Disassembly



16. Lift A21 NIBP PCB out.

Caution!

Possible Skin Burns. Do not open the CO2 scrubber device (part of the CO2 module). Scrubber material may cause caustic burns. If scrubber material comes in contact with skin, rinse the area of contact thoroughly with water. If scrubber material comes in contact with eyes, flush eyes with water for 15 minutes, and seek immediate medical attention.

17. Lift A23 CO2 PCB out.

To install A21 NIBP, A23 CO2, and A16 SpO2 PCBs, reverse the above steps. Observe the following:

- The A23 CO2 PCB must have W30 adapter cable and ground strap (370) connected to it prior to inserting it into the Lower Foam Support. Route W30 cable end must be accessible for later access.
- The A21 NIBP PCB must have W27 cable and W29 tubing connected to it prior to inserting it into the Lower Foam Support. Route W27 cable down the center of the PCB between the components, then lay W29 tubing on top of it.
- The A21 NIBP PCB must also have two hex standoffs on the far side prior to inserting it into the Lower Foam Support.

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A21 NIBP/A23 CO2 Module Disassembly

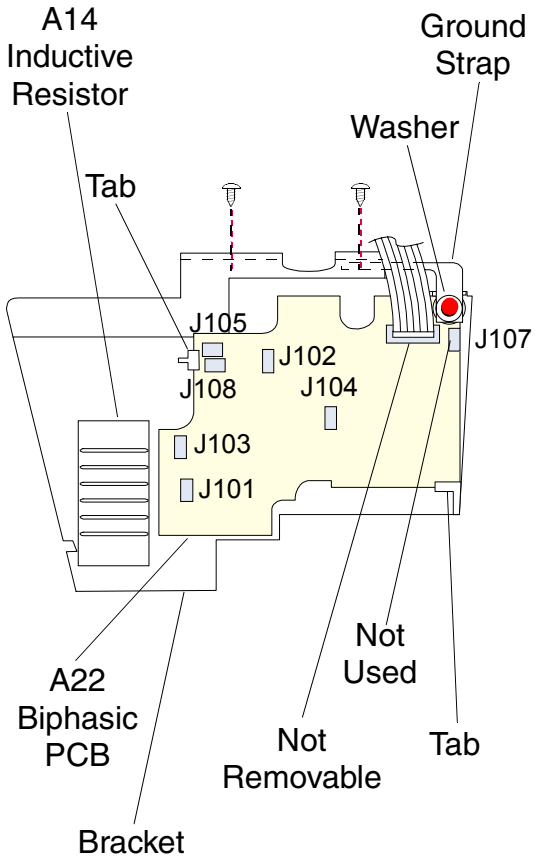
- If the NIBP tube has been disconnected/reconnected from the inline fitting previously, each tube end should be trimmed to maintain an airtight seal.
- The Upper Foam Support must have a Nomex OEM PCB Shield (**384**) between it and the A06 OEM PCB.

For the next procedure, see **Summary of Replacement Procedures**, or

Return to:

Power PCB	**Rear Case Replacement—Biphasic**
Battery Pins/Power PCB Cable	**Rear Case Replacement—Edmark**

A22 Biphasic PCB/A14 Inductive Resistor Replacement—Biphasic Devices Only



To remove the A22 Biphasic PCB and/or the A14 Inductive Resistor (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Locate the A22 Biphasic PCB on the **Inside Rear Case** drawing.
4. Remove one screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
5. Cut three small cable ties (**222**) that secure the **A22 Biphasic PCB wiring**.
6. Remove the three spade terminal connections at the A17 Interconnect Bracket terminals 3, 6, and 9. A gripping tool may be necessary.
7. Remove two screws (**230**) securing the A22 Biphasic PCB bracket (**324**) to the rear case.
8. Partially lift the A22 Biphasic PCB bracket and remove spade terminal connection J104. Remove the PCB with bracket.

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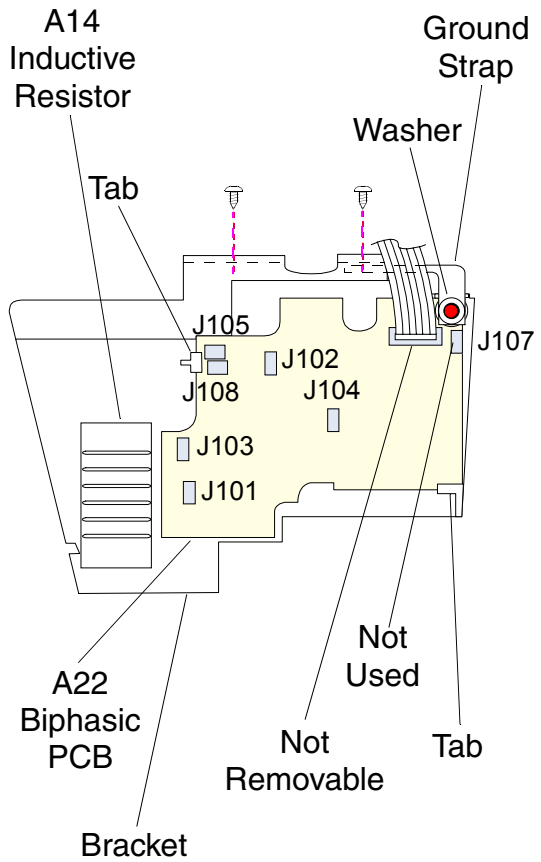
A22 Biphasic PCB/A14 Inductive Resistor Replacement—Biphasic Devices Only



9. Remove spade terminals J102 and J108 from the PCB.
10. The A14 Inductive Resistor may be removed from the bracket prior to removing the PCB from the bracket. To remove the Inductive Resistor from the bracket (**324**), pull firmly. It will snap out. A14 Inductive Resistor removal is complete.
11. To continue removing the A22 Biphasic PCB, remove the screw (**230**), washer (**336**), and ground strap (**374**) from the PCB.
12. Remove the A22 Biphasic PCB from the bracket as follows:
    a. Orient the PCB bracket as shown in the diagram (with the mounting tabs on top and one PCB mounting hole in the upper right hand corner).
    b. Slide the PCB to the right slightly.
    c. Rotate the PCB counterclockwise to clear the tab at the lower right-hand corner.
    d. Pull the PCB to the right as you lift it out.

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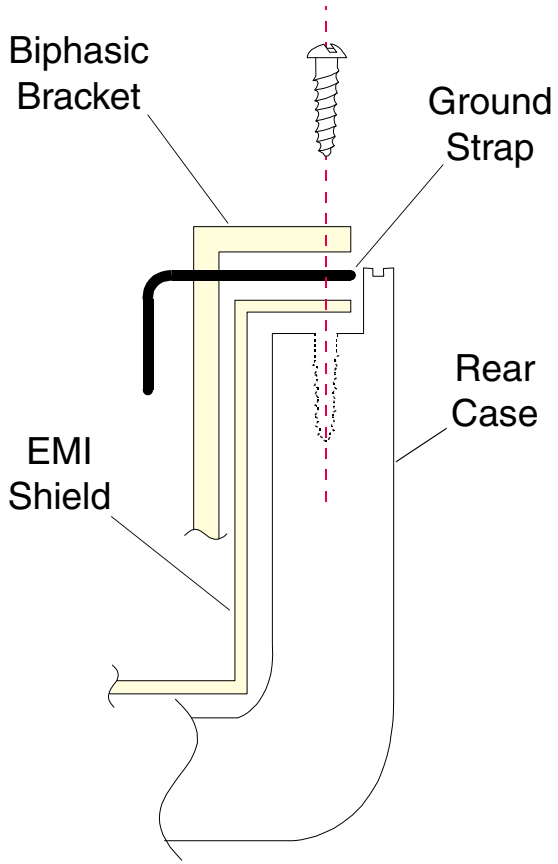
A22 Biphasic PCB/A14 Inductive Resistor Replacement—Biphasic Devices Only



Section View

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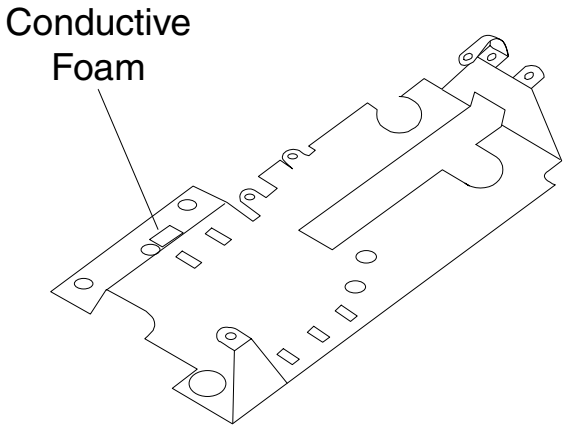
To install the A22 Biphasic PCB, reverse the above steps in addition to following the steps below.

1. Install the A22 Biphasic PCB into the bracket as follows:
   a. Orient the PCB and bracket as shown in the diagram on the previous page (with the mounting tabs on top and one PCB mounting hole in the upper right hand corner).
   b. Direct the lower left-hand corner of the PCB into place with the PCB rotated counterclockwise about 5° (just enough to clear the tab at the lower right-hand corner).
   c. Slide the PCB to the left into place. (The PCB is in place when the PCB hole is lined up with the threaded hole in the bracket.)
2. Install the Inductive Resistor (**A14**) into the bracket (**324**) with the wires pointing away from the bracket. Twist the wires together and plug the spade terminal connections onto spades J102 and J108 on the A22 Biphasic PCB. After the PCB and bracket are reinstalled, push the Inductive Resistor wires deep into the case.

Note: The ground strap (**374**) must contact the EMI Shield.

For the next procedure see **Summary of Replacement Procedures.**

EMI Shield Replacement



To remove the EMI Shield (**150**) (rear case):

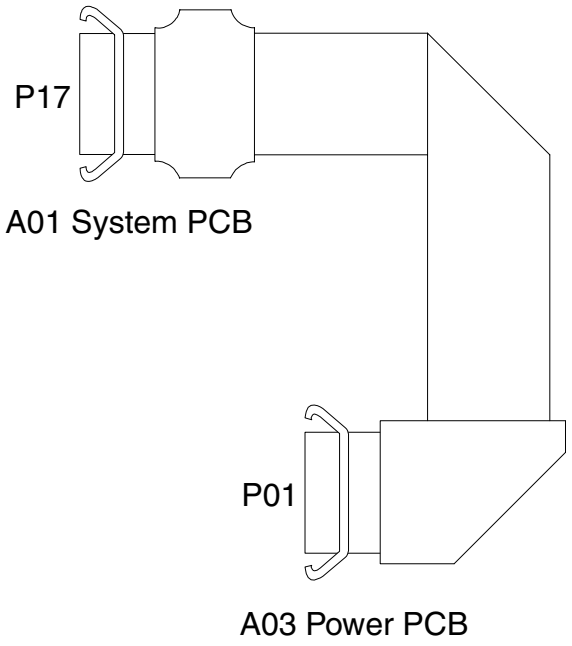
1. Complete the **W10 Battery Cable Replacement—Edmark** or the **W10 Battery Cable Replacement—Biphasic** procedure.
2. Lift the EMI Shield up and out.

To install the EMI Shield, reverse the above steps. Observe the cable tie replacement when reinstalling.

Note: The new EMI Shield should have a conductive foam strip on it where the CO2 PCB is installed (see diagram at left).

For the next procedure, see **Summary of Replacement Procedures**.

W01 Power PCB/System PCB Cable Replacement



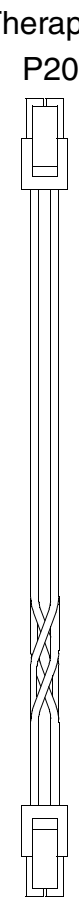
To remove the W01 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, steps 2 and on.
3. For orientation, locate A03 Power PCB-J17 on the **Inside Rear Case** drawing. (The Therapy PCB-J20 end of the W02 Cable was disconnected as part of step 2.)
4. Compress the connector retaining clips and disconnect the W01 Cable at A03 Power PCB-J17.

To install the W01 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

W02 Power PCB/Therapy PCB Cable Replacement



To remove the W02 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure.
3. For orientation, locate A03 Power PCB-J08 on the **Inside Rear Case** drawing.
4. Compress the connector retaining clip and disconnect the W02 Cable at A03 Power PCB-J08.

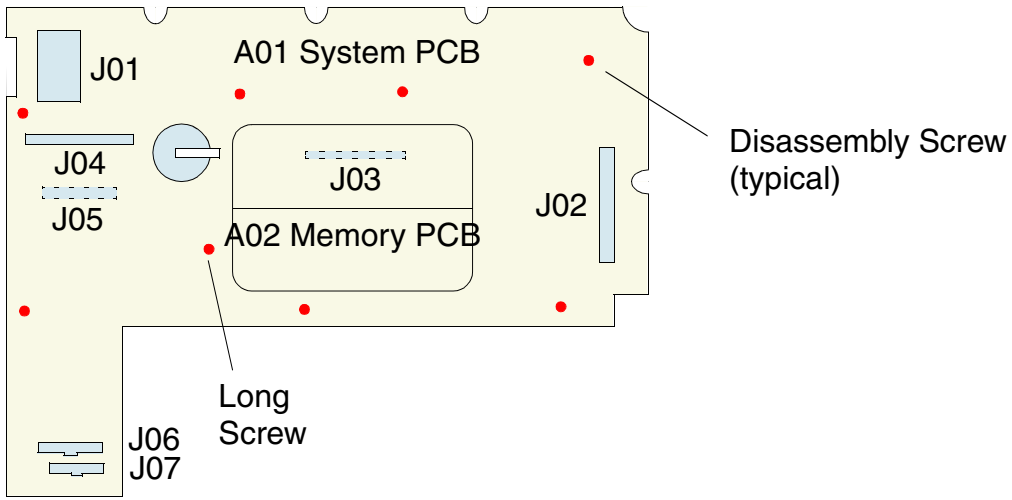
To install the W02 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

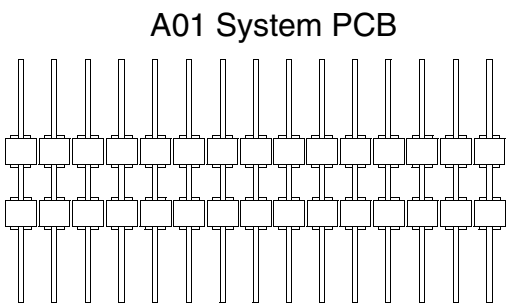
W03 System PCB/Therapy PCB Connector Replacement

To remove the W03 Connector (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, steps 2 and on.
3. Place the System/Memory/Therapy PCB device with A01 System PCB face up. Remove seven screws (**230**) and one screw (**296**). Make sure you loosen the screws and not the screw posts.



W03 System PCB/Therapy PCB Connector Replacement

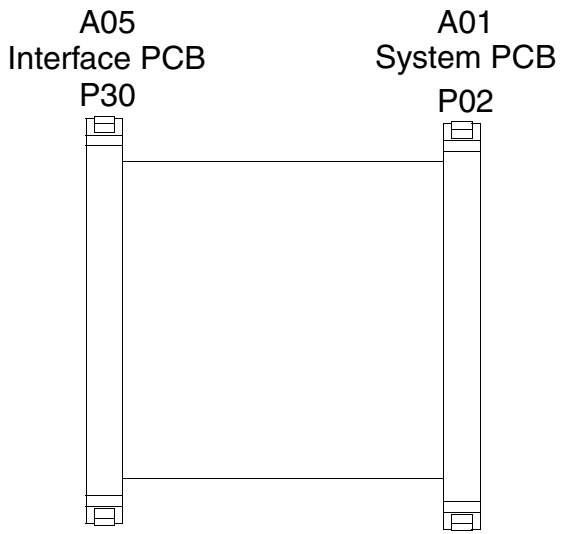


4. Gently lift the A01 System PCB/A02 Memory PCB up and away from the Therapy PCB. The two PCBs are linked by the W03 Connector, which is a direct-connection contact assembly (see diagram at left).
5. Remove the W03 Connector from the PCB that has the contact assembly.

To install the W03 Connector, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

W04 System PCB/Interface PCB Cable Replacement



To remove the W04 Cable (front case):

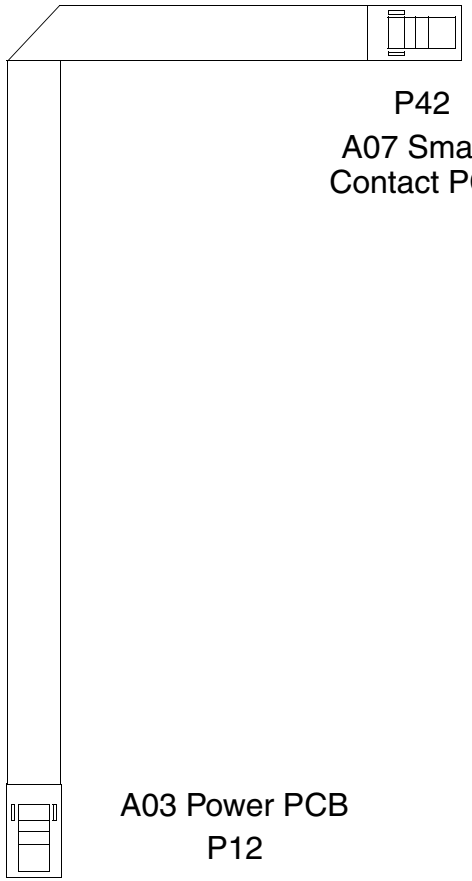
1. Complete the **Case Disassembly** procedure. This procedure removes the W04 Cable from A01 System PCB-J02.
2. For orientation, locate the W04 Cable on the **Inside Front Case** drawing.
3. Compress the connector retaining clips to unlock the connector, and disconnect the W04 Cable at A01 System PCB-J02.

Note: Notice the cable markings J02 and J30 during re-installation. If this cable is installed backwards, it may be pinched between case halves.

To install the W04 Cable, reverse the above steps. Make sure you “snap” the connector retaining clips into the locked position.

For the next procedure, see **Summary of Replacement Procedures**.

W05 Power PCB/Smart Contact PCB Cable Replacement



To remove the W05 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, beginning at step 2.
3. Complete the **A07 Smart Contact PCB Replacement** procedure, which disconnects the W05 Cable at A07 Smart Contact PCB-J42.
4. For orientation, locate A03 Power PCB-J12 on the **Inside Rear Case** drawing.
5. Compress the connector retaining clip and disconnect the W05 Cable at A03 Power PCB-J12. Remove the cable.

To install the W05 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

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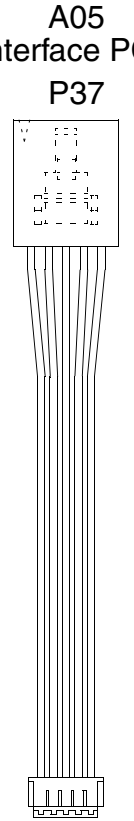
W06 Backlight PCB/Interface PCB Cable Replacement—LCD Device Only



To remove the W06 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W06 Cable on the **Inside Front Case** drawing.
3. Press the connector retaining clip and disconnect the W06 Cable at A05 Interface PCB-J37.
4. Place even pressure on the cable and ease the W06 Cable out of the connector at A08 Backlight-J49.

To install the W06 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

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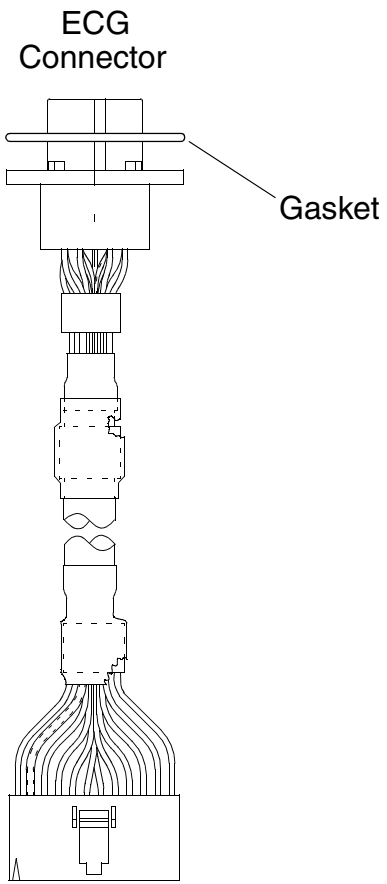
W07 ECG Connector Cable Replacement



To remove the W07 ECG Connector Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **Parameter Bezel Removal** procedure.
3. Remove four screws (**230**) and washers (**336**) securing the W07 ECG Connector Cable. Remove the connector and gasket.

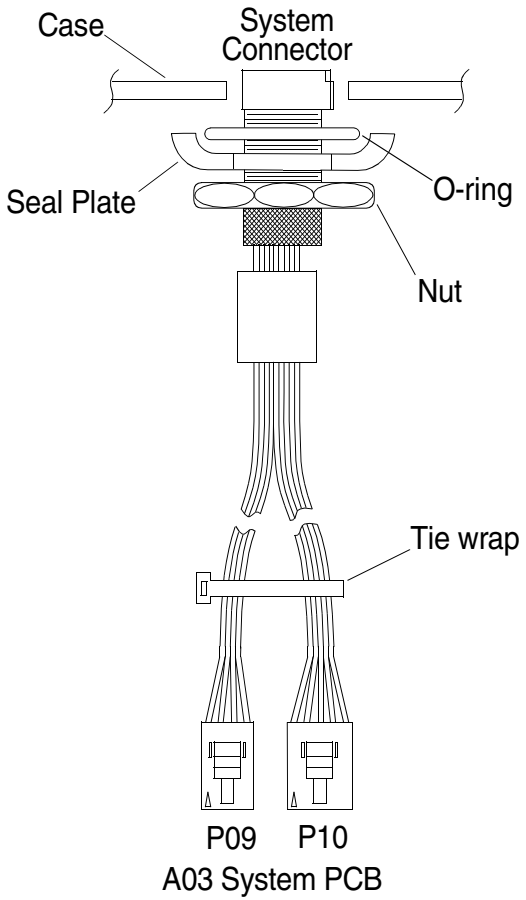
To install the W07 ECG Connector Cable, reverse the above steps, using a new gasket (**236**).

CAUTION!

Possible moisture leakage. When installing the W07 ECG Connector Cable, use a new gasket (236) to help prevent ingress of fluids.

For the next procedure, see **Summary of Replacement Procedures**.

W08 System Connector Cable Replacement



To remove the W08 System Connector Cable (rear case):

1. Complete the **Parameter Bezel Removal** procedure.
2. Remove the W08 System Connector Cable nut (**214**), connector seal plate (**220**), and O-ring seal (**240**). Remove the connector.

To install the W08 System Connector Cable, reverse the above steps. Observe the cable tie replacement when reinstalling the A03 Power PCB. Also note that the O-ring and the seal plate should slide over the connector threads separately.

CAUTION!

Possible moisture leakage. When installing the W08 System Connector Cable, use a new O-ring (240) to help prevent ingress of fluids.

For the next procedure, see **Summary of Replacement Procedures**.

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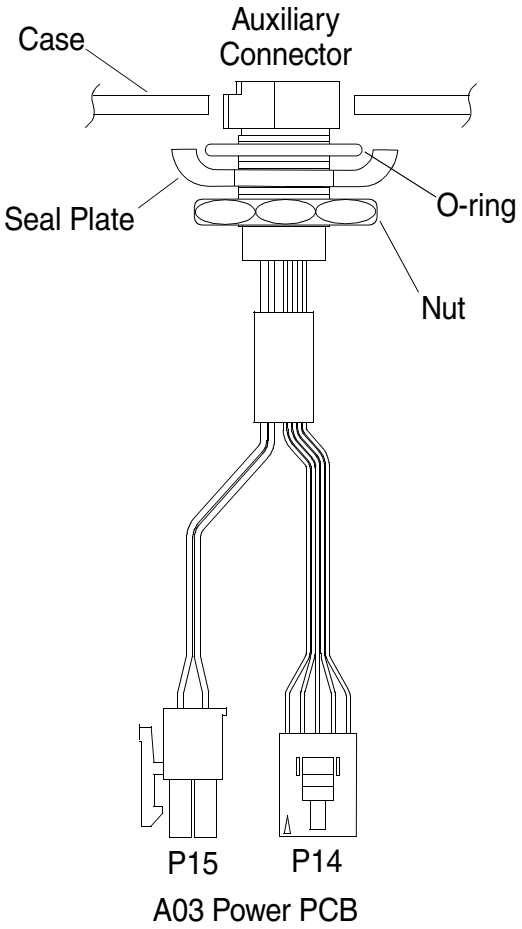
W09 Auxiliary Connector Cable Replacement



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To remove the W09 Auxiliary Connector Cable (rear case):

1. Complete the **Parameter Bezel Removal** procedure.
2. Remove the W09 Auxiliary Connector Cable nut (**214**), connector seal plate (**220**), and O-ring seal (**240**). Remove the connector.

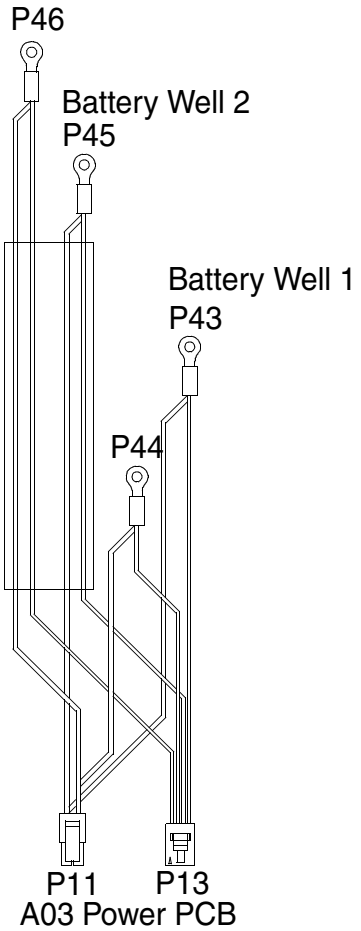
To install the W09 Auxiliary Connector Cable, reverse the above steps.Observe the cable tie replacement when reinstalling the A03 Power PCB. Also note that the O-ring and the seal plate should slide over the connector threads separately.

CAUTION!

Possible moisture leakage. When installing the W09 Auxiliary Connector Cable, use a new O-ring (240) to help prevent ingress of fluids.

For the next procedure, see **Summary of Replacement Procedures**.

W10 Battery Pins/Power PCB Cable Replacement—Edmark Devices



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To remove the W10 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure, steps 2 and on.
3. Remove the **A06 OEM PCB** (if installed), **A13 Transfer Relay Assembly**, **A14 Waveshaping Inductor**, **A15 Energy Storage Capacitor**, and **W21 Cable**.
4. For orientation, locate the A03 Power PCB on the **Inside Rear Case** drawing.
5. Complete the **A21 NIBP/A23 CO2 Module Disassembly** (procedure steps 6 through 12).
6. Cut the cable tie securing the W10 Cable wiring to A03 Power PCB-J11 and A03 Power PCB-J13.
7. Depress the connector retaining clip and disconnect the W10 Cable at A03 Power PCB-J11 also at A03 Power PCB-J13.

W10 Battery Pins/Power PCB Cable Replacement—Edmark Devices

8. Remove the four nuts (**216**) and lock washers to disconnect terminals P43 and P44 at Battery Well 1 and P45 and P46 at Battery Well 2. Note wire orientation for reinstalling the wires to the same studs. Remove the cable.

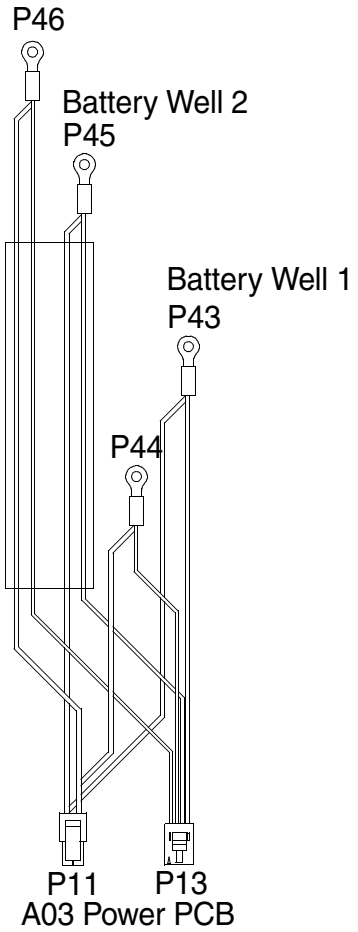
To install the W10 Cable, reverse the above steps. Observe the cable tie replacement when reinstalling the A03 Power PCB.

For the next procedure, see **Summary of Replacement Procedures**, or

Return - to:

EMI Shield Replacement

W10 Battery Pins/Power PCB Cable Replacement—Biphasic Devices



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To remove the W10 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning at step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning at step 3.
4. Complete the **A15 Energy Storage Capacitor Replacement** beginning at step 3.
5. Note the orientation of the P22 wiring for reinstallation, then remove the A13 Transfer Relay Assembly.
6. For orientation, locate the A03 Power PCB on the **Inside Rear Case** drawing.
7. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure (steps 6 through 12).
8. Cut the cable tie securing the W10 Cable wiring to A03 Power PCB-J11 and A03 Power PCB-J13.
9. Depress the connector retaining clip and disconnect the W10 Cable at A03 Power PCB-J11 and similarly at A03 Power PCB-J13.

W10 Battery Pins/Power PCB Cable Replacement—Biphasic Devices

10. Remove the four nuts (**216**) and lock washers to disconnect terminals P43 and P44 at Battery Well 1 and P45 and P46 at Battery Well 2. Note wire orientation for reinstalling the wires to the same studs. Remove the cable.

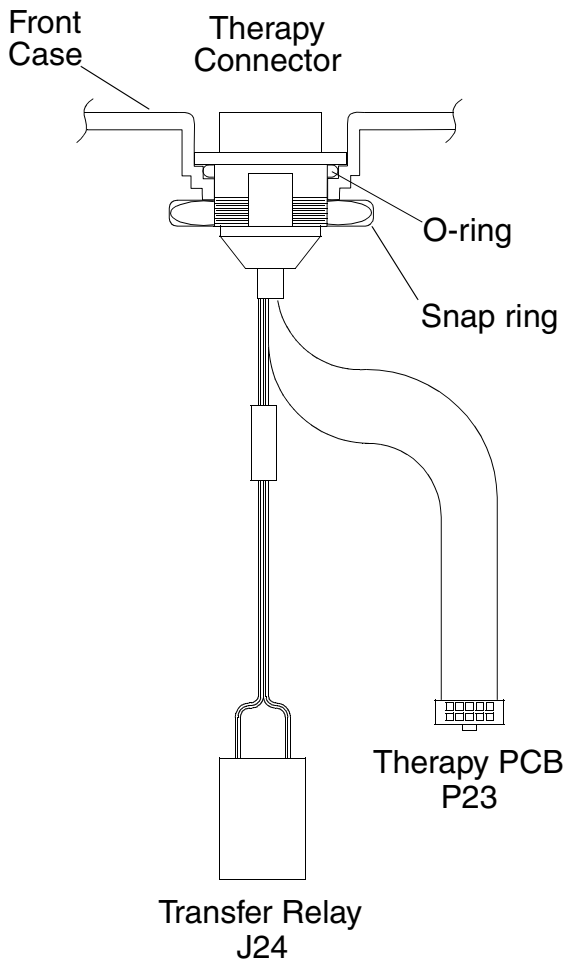
To install the W10 Cable, reverse the above steps. Observe the cable tie replacement when reinstalling the A03 Power PCB.

For the next procedure, see **Summary of Replacement Procedures**.

Return - to:

EMI Shield Replacement

W11 Therapy Connector Cable Replacement



To remove the W11 Therapy Connector Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W11 Therapy Connector Cable on the **Inside Front Case** drawing.
3. From the inside of the front case, remove the W11 Therapy Connector Cable snap ring (**218**).
4. From the outside of the case, remove the W11 Therapy Connector Cable.

To install the W11 Therapy Connector Cable:

1. Install a new O-ring (**238**) on the backside of the W11 Therapy Connector Cable.
2. Insert the W11 Therapy Connector Cable and align with the key-slot in the cavity.
3. Install the snap ring (**218**).

CAUTION!

Possible moisture leakage. When installing the Therapy Connector, use a new O-ring (238) to help prevent ingress of fluids.

For the next procedure, see **Summary of Replacement Procedures**.

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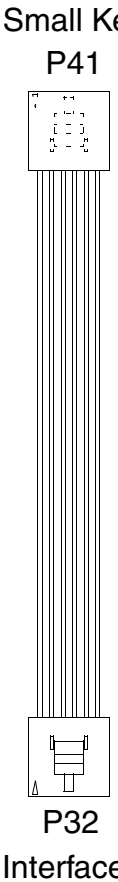
W12 Small Keypad/Interface PCB Cable Replacement



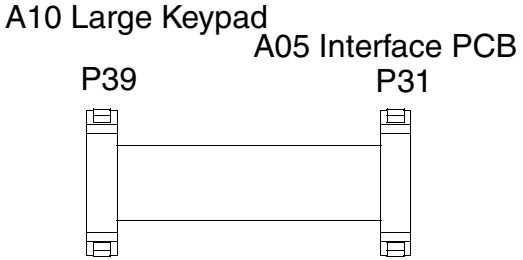
To remove the W12 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W12 Cable on the **Inside Front Case** drawing.
3. Depress the connector retaining clip and disconnect the W12 Cable at A05 Interface PCB-J32.
4. Depress the connector retaining clip and disconnect the W12 Cable at A09 Small Keypad-J41.

To install the W12 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

W13 Large Keypad/Interface PCB Cable Replacement



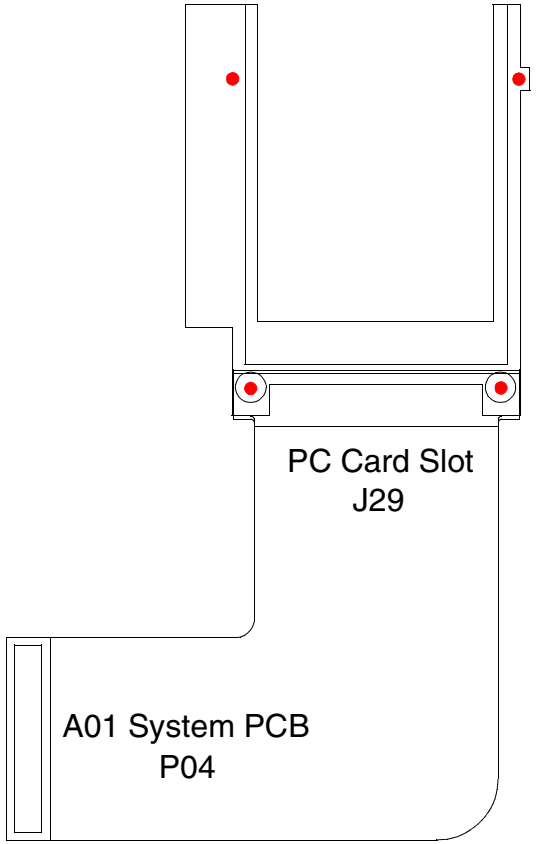
To remove the W13 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W13 Cable on the **Inside Front Case** drawing.
3. Compress the connector retaining clips to unlock the connector and disconnect the W13 Cable at A05 Interface PCB-J31.
4. Compress the connector retaining clips to unlock the connector, and disconnect the W13 Cable at A10 Large Keypad-J39.

To install the W13 Cable, reverse the above steps. Make sure you “snap” the connector retaining clips into the locked position.

For the next procedure, see **Summary of Replacement Procedures**.

W14 System PCB/PC Card Slot Cable Replacement



To remove the W14 Cable (rear case):

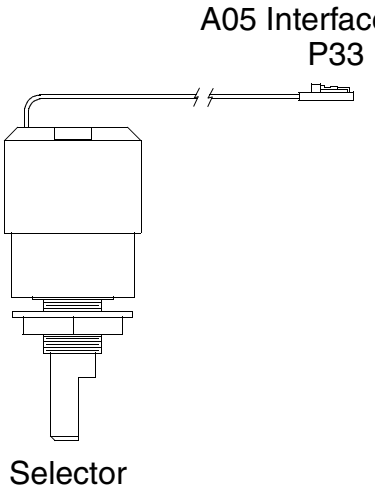
1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning at step 2.
3. Complete the **A06 OEM PCB Replacement** beginning at step 3.
4. Complete the **A03 Power PCB Replacement** procedure beginning at step 4.
5. For orientation, locate the W14 Cable on the **Inside Rear Case** drawing.
6. Remove four screws (**234**) securing J29 (PC Card slot connector) to the mounting bracket.

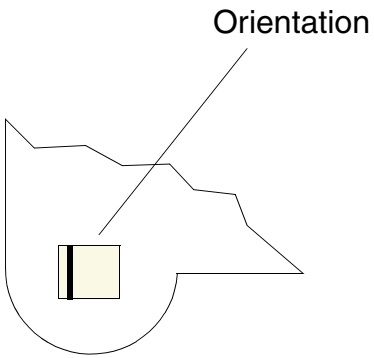
To install the W14 Cable, reverse the above steps.

Note: Do not overtighten screws. They may shear off.

For the next procedure, see **Summary of Replacement Procedures**.

W15 Selector Assembly Replacement





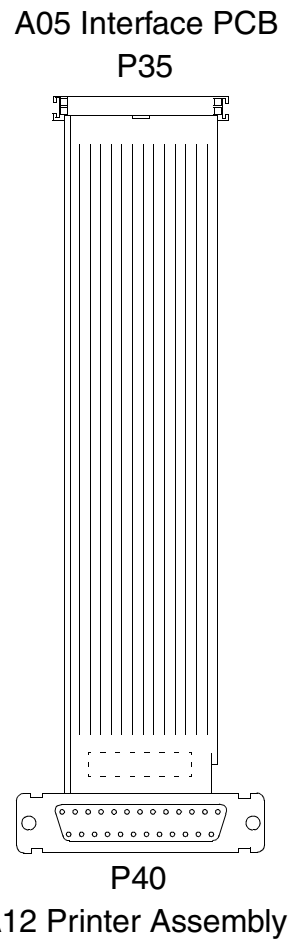
To remove the W15 Selector Assembly (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W15 Selector Assembly on the **Inside Front Case** drawing.
3. Depress the connector retaining clip and disconnect the W15 Selector Assembly at A05 Interface PCB-J33.
4. From the outside of the front case, grasp the W15 Selector Assembly knob and, with steady smooth force, pull the knob off the W15 Selector Assembly shaft. Use a gripping tool if necessary, taking care to avoid any damage.
5. From the outside of the case, loosen and remove the nut and lock washer (part of the W15 Selector Assembly) from the W15 Selector Assembly shaft.
6. From the inside of the case, pull the W15 Selector Assembly away from the case and remove.

To install the W15 Selector Assembly, reverse the above steps. Tighten the securing nut.

For the next procedure, see **Summary of Replacement Procedures**.

W16 Printer Assembly/Interface PCB Cable Replacement



To remove the W16 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W16 Cable on the **Inside Front Case** drawing.
3. Spread the connector retaining clips and eject the W16 Cable at A05 Interface PCB-J35.
4. Disconnect the W19 Cable ground terminal from the A12 Printer Assembly connector bracket.
5. Remove the retaining screw (**230**) and connector bracket (**50**) on the A12 Printer Assembly housing that secures W16 Cable-P40.
6. With a flat edge, gently pry the W16 Cable-P40 out of the connector at A12 Printer Assembly-J40. Remove and discard the rubber moisture gasket (**204**).

To install the W16 Cable, reverse the above steps. Observe the following:

- Use a new rubber moisture gasket in reassembly (**204**).
- Reconnect the W19 Cable before installing the W16 Cable.

For the next procedure, see **Summary of Replacement Procedures**.

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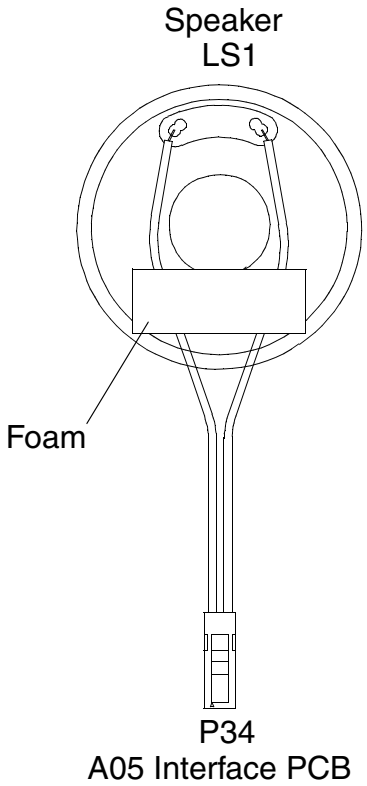
W17 Speaker Assembly Replacement



To remove the W17 Speaker Assembly (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W17 Speaker Assembly on the **Inside Front Case** drawing.
3. Depress the connector retaining clip and disconnect the W17 Speaker Assembly at A05 Interface PCB-J34.
4. Remove the screw (**230**) securing the retaining spring (**246**) for the W17 Speaker Assembly. Note the orientation of the retaining spring for reassembly.

To install the W17 Speaker Assembly, reverse the above steps.

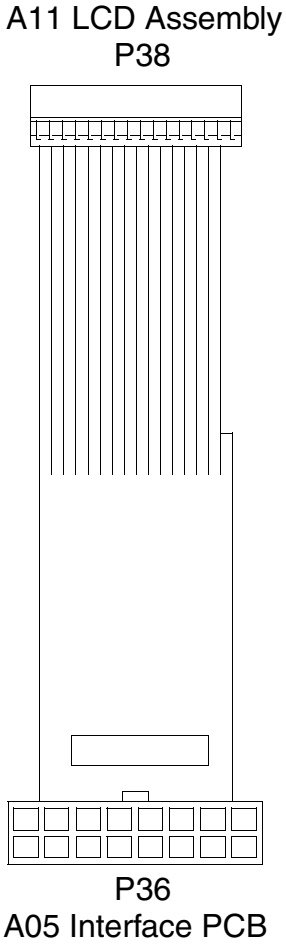
Note: Be sure you do not pinch the wires during reassembly.

CAUTION!

Possible moisture leakage. When installing the W17 Speaker Assembly, make sure the speaker felt moisture barrier (190) is in place to help prevent ingress of fluids. When replacing speaker, take care to not touch the felt.

For the next procedure, see **Summary of Replacement Procedures**.

W18 LCD Assembly/Interface PCB Cable Replacement—LCD Devices Only



To remove the W18 Cable (front case):

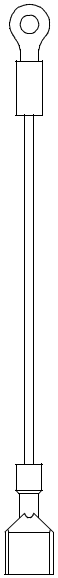
1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W18 Cable on the **Inside Front Case** drawing.
3. Spread the connector retaining clips and eject the W18 Cable at A05 Interface PCB-J36.
4. Place even pressure on the cable ribbon and ease the W18 Cable out of the edge connector at A11 LCD Assembly-J38.

To install the W18 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

505

W19 Printer Assembly/Chassis Ground Cable Replacement



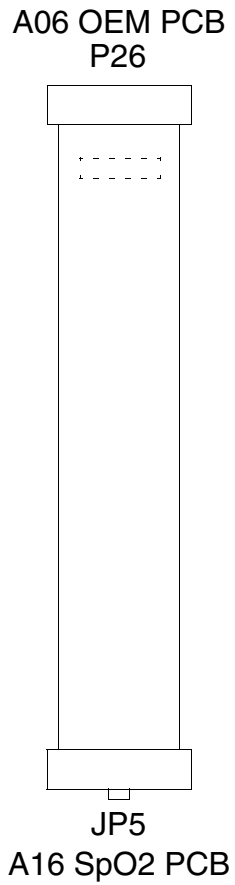
To remove the W19 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W19 Cable on the **Inside Front Case** drawing.
3. LCD Assembly only: Remove the screw (**230**) securing the W19 Cable to the A11 LCD Assembly Bracket (**42**).
4. EL Display only: Remove the screw (**230**) securing the W19 Cable to the A11 EL Display Assembly Bracket (**42**).
5. Disconnect the W19 Cable ground terminal from the A12 Printer Assembly connector bracket.

To install the W19 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

W21 OEM PCB/SpO2 Module Cable Replacement



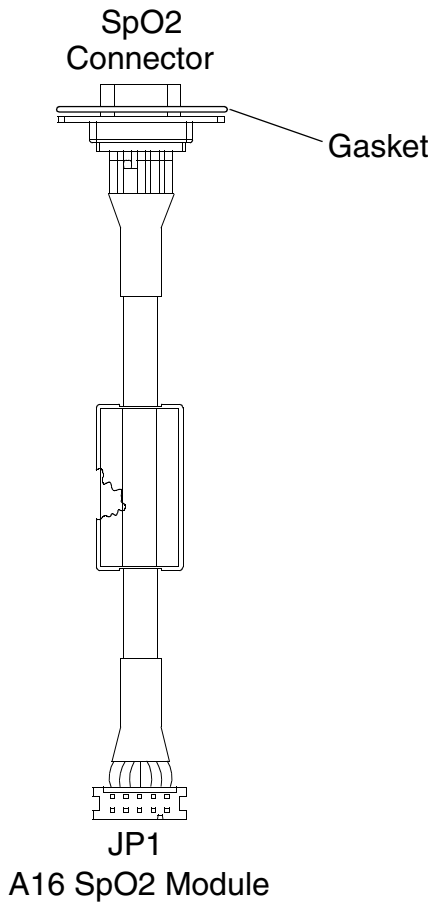
To remove the W21 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning at step 2.
3. For orientation, locate A06 OEM PCB-J26 on the **Inside Rear Case** drawing.
4. Spread the connector retaining clips and eject the W21 Cable from A06 OEM PCB-J26A.
5. Remove the metal retaining clip (**228**) and disconnect the W21 Cable at A16 SpO2 Module-JP5.

To install the W21 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

W22 SpO2 Connector Cable Replacement



To remove the W22 SpO2 Connector Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **Parameter Bezel Removal** procedure beginning at step 2.
3. Remove two screws (**376**) securing the W22 SpO2 Connector Cable. Remove the connector and gasket (**206**).

To install the W22 SpO2 Connector Cable, reverse the above steps, using a new gasket (**206**).

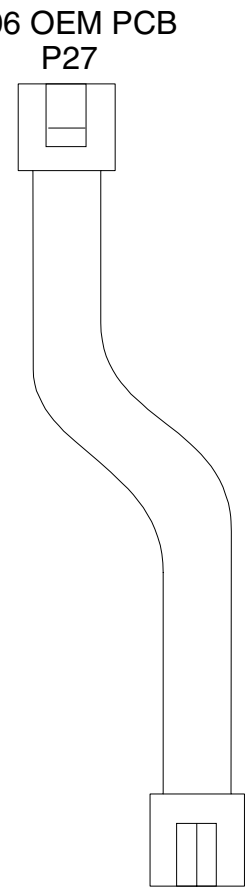
Note: Place the connector screws through the connector and seal, and then attach to the parameter bezel.

CAUTION!

Possible moisture leakage. When installing the SpO2 cable, use a new gasket (206) to help prevent ingress of fluids.

For the next procedure, see **Summary of Replacement Procedures**.

W26 OEM PCB/CO2 PCB Cable Replacement



To remove the W26 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Complete the **A06 OEM PCB Replacement** beginning at step 3. (The W26 Cable will now be disconnected from the A06 OEM PCB.)
4. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure steps 4 and on.
5. Disconnect the W26 Cable from A23 CO2 PCB-J4.

To install the W26 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

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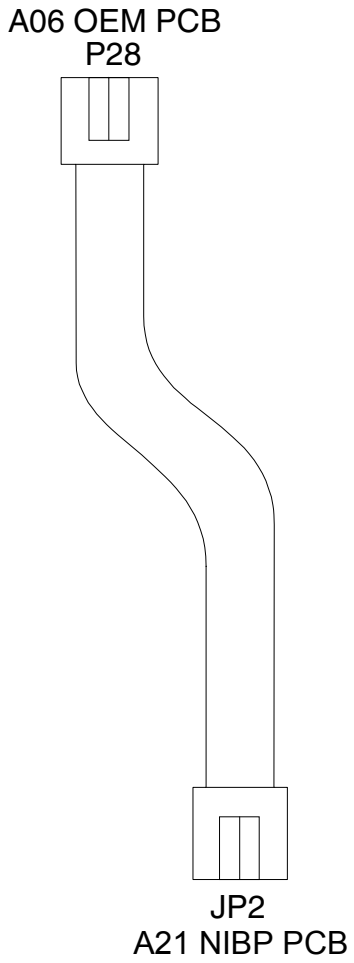
W27 OEM PCB/NIBP PCB Cable Replacement



To remove the W27 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning at step 2.
3. Complete the **A06 OEM PCB Replacement** beginning at step 3. (The W27 Cable will now be disconnected from the A06 OEM PCB.)
4. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure beginning at step 4.
5. Disconnect the W27 Cable from A21 NIBP PCB-J2.

To install the W27 Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

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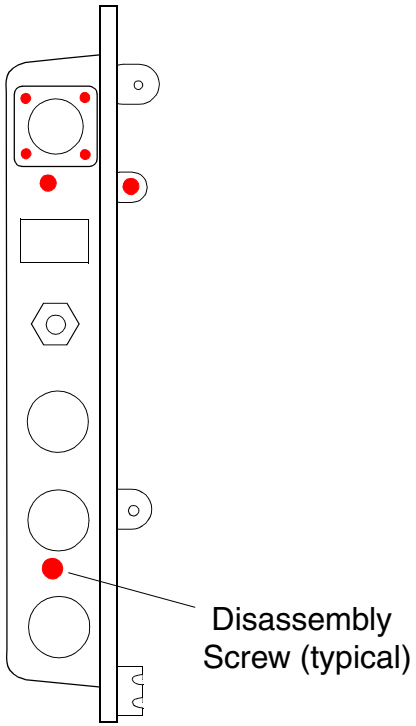
W28 CO2 Connector Removal



To remove the W28 CO2 Connector (parameter bezel):

Note: If the A23 CO2 PCB has already been removed then skip steps 1 through 3. Also, Parameter Bezel Removal (step 4) will be partially completed.

Note: These steps include the A06 OEM PCB and all options on the Parameter Bezel. Your device may not have some of these options.

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning at step 2.
3. Complete the **A06 OEM PCB Replacement** steps 3 and on.
4. Complete the **Parameter Bezel Removal** step 2 and on.
5. Remove four screws (**376**), securing the CO2 Connector Adapter (**354**) to the parameter bezel. Remove the CO2 Connector Adapter and, from the underside of the bezel, remove the CO2 Connector Retainer (**358**) and Seal (**360**).

W28 CO2 Connector Removal

To install the new W28 CO2 Connector, reverse the steps above and observe the following:

1. Set the CO2 Connector Adapter (**354**) in place on the face of the new bezel, and the CO2 Connector Retainer (**358**) and Seal (**360**) in place on the underside of the bezel, and screw together with four screws (**376**).

   Note: The CO2 Connector Adapter should have a magnet glued in place on its underside.

2. Apply the Parameter Bezel Label (**158**) to the new bezel front.
3. Install CO2 Connector Cover (**356**) onto the Adapter.

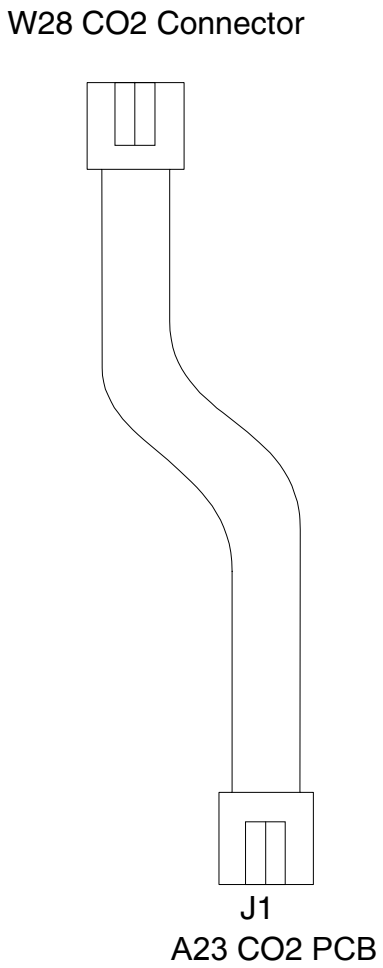
For the next procedure, see **Summary of Replacement Procedures**.

Replacing the CO2 Connector and Connector Cover

To replace the CO2 Connector and Connector Cover:

1. Pull the CO2 Connector Cover off.
2. Lift one corner of the Parameter Bezel Label and peel it off.
3. Screw (Clockwise) the CO2 Connector Tool into the CO2 Connector.
4. Remove the 4 screws securing the CO2 Connector, and remove the connector (sliding it up the Connector Tool).
5. Slide the new connector down the Connector Tool.
6. Install the 4 securing screws (using the Connector Tool to align the holes).
7. Remove the CO2 Connector Tool.
8. Replace the bezel label.
9. Install the CO2 Connector Cover (**356**) onto the Adapter.

W30 CO2 PCB Adapter Cable Replacement



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To remove the W30 Adapter Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning at step 2.
3. Complete the **A06 OEM PCB Replacement** beginning at step 3. (The W30 Adapter Cable will now be disconnected from the W28 CO2 Connector cable.)
4. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure beginning at step 4.
5. Note the position of the ferrite bead and wire routing, then disconnect the W30 Cable from A23 CO2 PCB-J1.

To install the W30 Adapter Cable, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

W31 CO2 Exhaust Tube Replacement

Battery Retainer

A23 CO2 PCB pump

To remove the W31 Exhaust Tube (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning at step 2.
3. Complete the **A06 OEM PCB Replacement** beginning at step 3.
4. Complete the **A21 NIBP / A23 CO2 PCB Disassembly** procedure steps 4 and on. (The W31 Exhaust Tube will now be disconnected from the Case.)
5. Disconnect the W31 Exhaust Tube from A23 CO2 PCB pump.

To install the W31 Exhaust Tube Replacement, reverse the above steps, and ensure that the outer tube is pushed fully onto the battery retainer fitting.

For the next procedure, see **Summary of Replacement Procedures**.

W33 Invasive Pressure Connector Assembly Removal

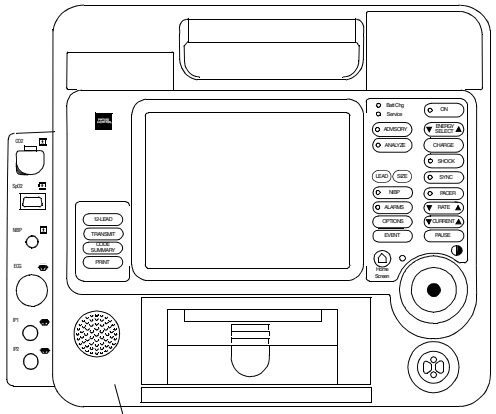
To Remove the Invasive Pressure Connector Assembly:

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning at step 2.
3. Complete the **A06 OEM PCB Replacement** steps 3 and on.
4. Complete the **Parameter Bezel Removal** step 2 and on.
5. Remove the 8 screws securing the IP Connectors to the parameter bezel. Remove the IP Connectors and Seals.
6. Disconnect the IP Connector Cable from the A01 System PCB J7 connector.

To install the W33 Invasive Pressure Connector Assembly, reverse the above steps.

For the next procedure, see **Summary of Replacement Procedures**.

Front Case Replacement



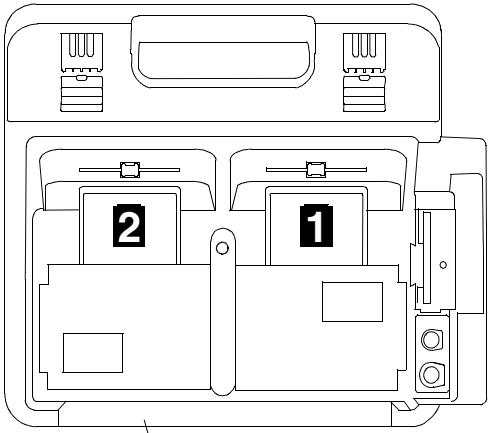
Front Case

To remove the front case:

1. Remove the **A12 Printer Assembly**.
2. Complete the **Case Disassembly** procedure.
3. To identify components, see the **Inside Front Case** drawing.
4. Remove the **A05 Interface PCB**, **A09 Small Keypad**, and **A10 Large Keypad**. In reinstallation, use new keypads. (Make sure the date code on the new keypads has not expired.)
5. Device with LCD Assembly only: Conduct the **Front Case Metal Shield Disassembly** procedure (which also removes the A08 Backlight PCB).
6. Remove the **A11 LCD Assembly** or the **A11 EL Display Assembly**, the **W15 Selector Assembly**, **W17 Speaker Assembly**, and **W11 Therapy Connector Cable**.
7. Remove the **W16 Cable**, **W19 Cable**.
8. Remove the **Display Lens**. In reassembly, use a new lens.
9. Transfer the screw (**230**), printer bracket (**50**), and gasket (**204**) to the new front case.

To install the front case, reverse the above steps.

Rear Case Replacement—Edmark Devices



Rear Case

To remove the rear case:

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Complete the **A06 OEM PCB Replacement** beginning at step 3, if installed.
4. Complete the **Parameter Bezel Removal** procedure beginning at step 4 to remove the bezel, the modem and power PCBs and all the option connectors.
5. Complete the **A21 NIBP / A23 CO2 Module Disassembly** procedure beginning at step 4 to remove optional A16 SpO2, A21 NIBP, A23 CO2 PCBs, if installed.
6. Complete steps 5 through 8 of the **A13 Transfer Relay Assembly Replacement**.
7. Complete steps 5 through 8 of the **A14 Waveshaping Inductor Replacement**.
8. Complete steps 7 and 8 of the **A15 Energy Storage Capacitor Replacement** (includes A17 Interconnect Bracket).
9. Remove the **A07 Smart Contact PCB**.

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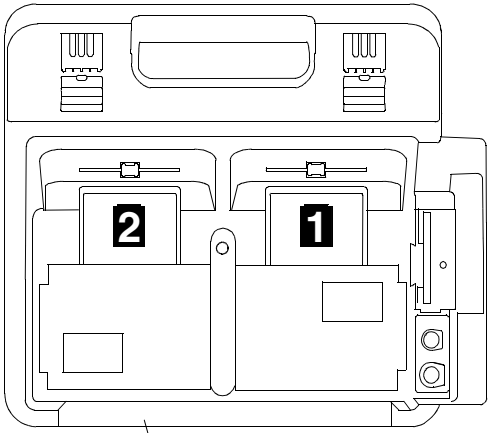
Rear Case Replacement—Edmark Devices

10. Remove the **W08 System Connector Cable**, **W09 Auxiliary Connector Cable**, **W10 Cable** (including the battery pins), and **W14 Cable**.
11. Transfer the following from the old rear case to the new rear case:
    Drain seal (**16**)
    EMI shield (**150**)

To install the rear case, reverse the above steps.

Rear Case Replacement—Biphasic Devices



Rear Case

To remove the rear case:

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure steps 2 and on.
3. Complete the **A06 OEM PCB Replacement** steps 3 and on, if installed.
4. Complete the **Parameter Bezel Removal** procedure steps 4 and on to remove the bezel, the modem and power PCBs, and all the option connectors.
5. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure steps 4 and on to remove optional A16 SpO2, A21 NIBP, A23 CO2 PCBs, if installed.
6. Complete steps 5 through 10 of the **A13 Transfer Relay Assembly Replacement**.
7. Observe orientation, then cut the large tie wrap (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.
8. Remove the **A07 Smart Contact PCB**.
9. Remove the **W08 System Connector Cable**, **W09 Auxiliary Connector Cable**, or **W10 Cable—Biphasic** (including the battery pins), and **W14 Cable**.

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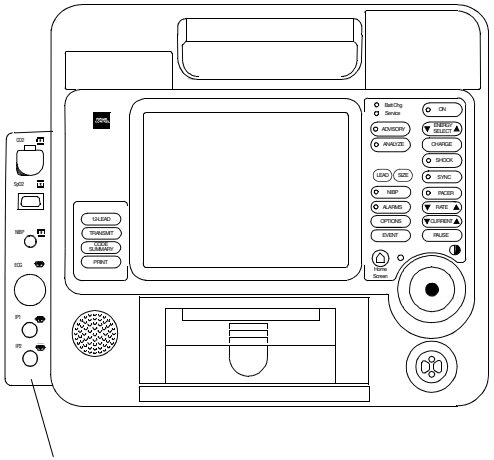
Rear Case Replacement—Biphasic Devices

10. Transfer the following from the old rear case to the new rear case:
    Drain seal (**16**)
    EMI shield (**150**)

Note: The new case should have a conductive foam strip on the inside back in the vicinity of the CO2 PCB (when PCB is installed).

To install the rear case, reverse the above steps.

Parameter Bezel Replacement



Parameter Bezel

To remove the Parameter Bezel (rear case):

1. Complete the **Parameter Bezel Removal** procedure.
2. Transfer the following items from the old Parameter Bezel to the new Parameter Bezel as they apply to your device:
   - **W07 ECG Connector Cable** and seal.
   - **W22 SpO2 Connector Cable** and seal.
   - NIBP tube, connector, nut, and seal.
   - W28 CO2 Connector and seal.
   - W33 Invasive Pressure Connector and seal.

Parameter Bezel Replacement

3. Transfer the **W28 CO2 Connector Assembly** to the new Parameter Bezel as follows:

   Note: The CO2 Connector Adapter (**354**) should have a magnet glued in place on its underside.

   a. Set CO2 Connector Adapter (**354**) in place on the face of the new bezel, and the CO2 Connector Retainer (**358**) and Seal (**360**) in place on the underside of the bezel, and screw together with four (**376**) screws.

   b. Apply the Parameter Bezel Label (**158**) to the new bezel front.

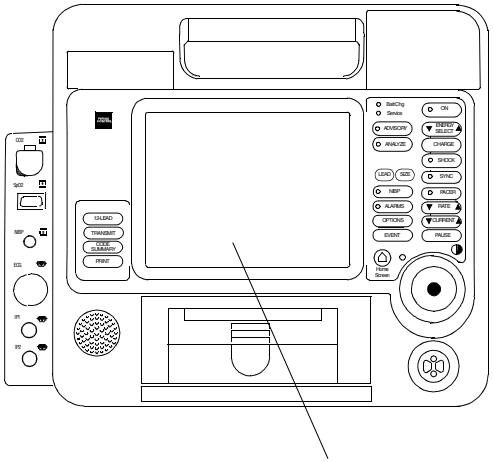
   c. Install the CO2 Connector Cover (**356**) onto the Adapter.

   d. Close the CO2 Connector Cover**.**

To install the new Parameter Bezel, reverse the steps in **Parameter Bezel Removal**.

For the next procedure, see **Summary of Replacement Procedures**.

Display Lens Replacement



Assembly Lens

CAUTION!

Possible A11 LCD Assembly Lens damage. The inside of the lens of the A11 LCD Assembly has a protective EMI coating that is extremely sensitive to abrasion. Never touch the inside surface of the A11 LCD Assembly Lens with your fingers, abrasive materials, or tools.

After the Display Lens is removed, it cannot be reused. It must be replaced with a new part. When removing the Display Lens, be extremely careful to avoid damaging the front case.

To remove the Display Lens (front case):

1. Complete the **Case Disassembly** procedure.
2. To identify components, see the **Inside Front Case** drawing.
3. LCD Assembly only: Conduct the **Front Case Metal Shield Disassembly** procedure (which also removes the A08 Backlight PCB). Lift the A11 LCD Assembly gently away from the front case by lifting up on the black rubber corner shock mounts (**6**). Pry the Display Lens away from the case.
4. EL Display only: Remove four screws (**230**). Lift the A11 EL Display Assembly gently away from the front case by lifting up on the corner screw tabs. Pry the Display Lens away from the case.

Display Lens Replacement

The following materials are required to install a new Display Lens:

- Photographer's gloves.
- A piece of felt, high-density foam, or other similar, dust-free, non-abrasive material, cut to the size of the Display Lens (use the old Display Lens as a guide). This material must be absolutely clean and dust-free.
- Wallpaper or linoleum roller, about 2 inches wide, or a screw driver with a heavy, rounded plastic handle.

CAUTION!

Possible A11 LCD Assembly Lens damage. The inside of the A11 LCD Assembly Lens has a protective EMI coating that is extremely sensitive to abrasion. Never touch the inside surface of the A11 LCD Assembly Lens with your fingers or any abrasive materials or tools. Medtronic Physio-Control recommends the wearing of photographer's gloves while installing a new A11 LCD Assembly Lens.

Display Lens Replacement

To install a new Display Lens:

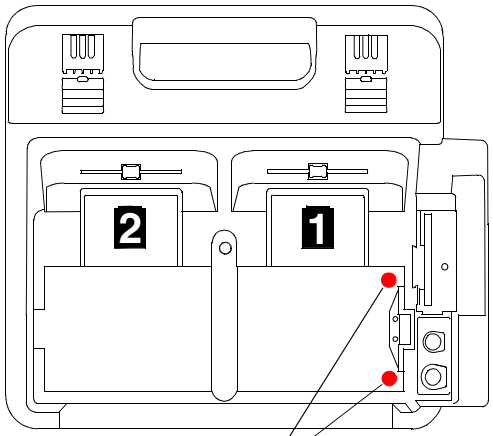
1. Using a soft cloth and isopropyl alcohol, clean the inside surface of the case in the area where the A11 Display Assembly Lens contacts the case.
2. While wearing photographer's gloves, unwrap the new Display Lens protective paper. Hold the Display Lens by the edges only.
3. Peel off the paper covering the adhesive and position the lower left corner of the Display Lens in the lower left corner of the lens mounting area.
4. Lower the Display Lens into position, and using finger pressure, run a gloved finger around the black area of the Display Lens.
5. Place the felt or other material over the inside surface of the lens and using the roller or the end of a rounded screw driver handle, apply heavy, even pressure to all the edges to remove all air pockets from the adhesive.
6. Reverse the remaining steps in the disassembly procedure on page 1 of 3.

CAUTION!

Possible moisture and/or EMI leakage. The new A11 Display Assembly Lens must be securely bonded to help prevent ingress of fluids.

For the next procedure, see **Summary of Replacement Procedures**.

Battery Pin Replacement



Battery Pins
(typical)

Inspect the battery connector pins as part of the routine physical inspection. Be sure to examine each leaf on the pins to make sure that they are not cracked or broken. Tighten any pins that are loose. Replace any pins that are bent, broken, corroded, worn, or damaged. Battery pins are replaced from outside the case.

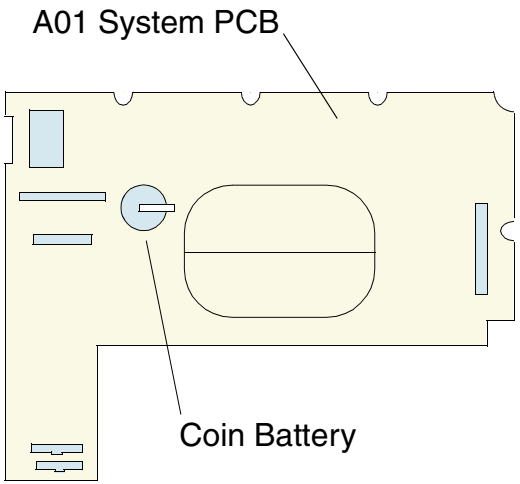
To replace a battery pin:

1. Using a 5/32-inch nut driver, unscrew the pin and remove.
2. Hand-thread the new battery pin (**186**) into position and then tighten firmly, but do not overtighten.

The battery pins are replaced every 2 years as part of the **Scheduled Replacement Items** listing.

Note: The battery grommets are not replaceable. Complete the **Rear Case Replacement Procedure** to repair damaged battery grommets.

Coin Battery Replacement



CAUTION!

Possible loss of device configuration. The coin battery powers the device real-time clock and a 32kx8 NVRAM memory device that stores the device configuration data, calibration data, and other important data. When removing this battery, you have about 2 minutes to insert the new battery or you may lose the device configuration data. If error codes indicating coin battery failure are logged, the NVRAM data has already been lost. Contact Medtronic Physio-Control Technical Services for assistance

To replace the coin battery on the A01 System PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Locate the coin battery in the adjacent drawing or, for orientation, see the **Inside Rear Case** drawing.
3. With the new coin battery, PN 202305-000 (type CR2032), at hand, lift the coin battery hold-down spring just enough to slide the old battery out of the holder base, then slide in the new battery, (+) terminal up. You have 2 minutes to complete this step.

Coin Battery Replacement

For the next procedure, see **Summary of Replacement Procedures** or continue to the **Case Reassembly** procedure.

The coin battery is replaced every 5 years as part of the **Scheduled Replacement Items** listing. To verify the device configuration has not been lost, see **Verifying the Device Configuration**.

Software Replacement and Device Upgrades

The LIFEPAK 12 defibrillator/monitor software replacement and device upgrade procedures require specialized training and entail information proprietary to Medtronic Physio-Control. These procedures may be performed only by authorized Medtronic Physio-Control personnel.

Contact your local Medtronic Physio-Control representative for assistance.

Verifying the Device Configuration Data

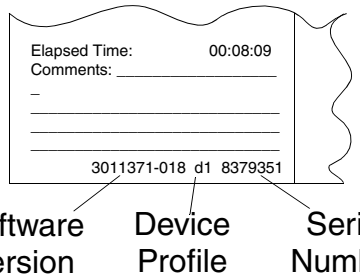
CAUTION!

Possible inoperable device. The configuration data is critical for proper operation of the device. If the device configuration data is lost, the device CAN NOT BE USED. Contact factory support if you lose this data.

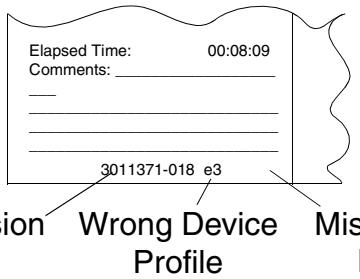
The device configuration data consists of the manufacturing code, device profile (options, features), serial number, calibration data, and user setup configuration. This data is stored on a 32-kilobyte memory device that is powered by a coin battery located on the A01 System PCB. If this coin battery is improperly replaced or is dead, then the device configuration data will be lost.

To check if your device has lost the configuration data information, turn on the device and press the CODE SUMMARY control. A device that has lost configuration data will not display a serial number on the Code Summary printout and may also list an incorrect Device Profile (see below).

Device with correct configuration data



Device with incorrect configuration data



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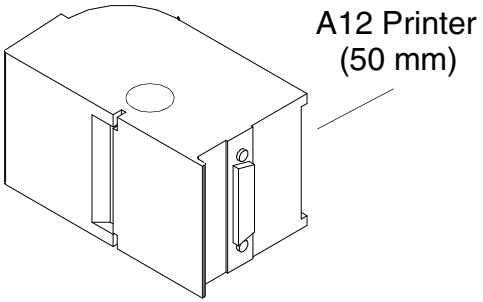
Verifying the Device Configuration Data

The LIFEPAK 12 defibrillator/monitor device configuration data may be loaded only by authorized Medtronic Physio-Control personnel. Contact your local Medtronic Physio-Control representative for assistance.

A12 Printer (50 mm) Repair Procedures



This section provides instructions for repairing the A12 Printer (50 mm). Also refer to the **A12 Printer (50 mm) Assembly Drawing** and the **A12 Printer (50 mm) Parts List** to locate parts specified in these procedures.

Only the parts available for replacement are listed. Other parts are shown for reference only.

To remove the A12 Printer (50 mm) from the front case, see the **A12 Printer Assembly (50 mm) Replacement** procedure.

Removing the Motor Assembly

To remove the Motor Assembly:

1. Using a knife blade or small slotted screw driver, pry out and remove the gear cover (**903**).
2. Remove the retaining ring (**910**) and the 31-tooth idler motor gear (**906**). Discard the retaining ring.
3. Remove the three flathead motor mounting screws (Part of **907**).
4. Push out and remove the motor (**907**) from the recorder chassis.
5. Pull off the motor connector tubing and remove the connector.

For the next procedure, see **Summary of Replacement Procedures**.

A12 Printer (50 mm) Repair Procedures

Installing the Motor Assembly

To install the motor assembly:

1. Plug the motor connector into the mating connector on the recorder chassis with the black wire facing toward the chassis bottom.

   Note: Do not reverse the black and red leads. This will cause the recorder to run backwards.

2. Slide the motor leads tubing fully over the connector and latch. (It may be necessary to expand the tubing with pliers before installing.) Make sure that the motor connector end is latched.
3. Install the gear end of the motor (**907**) into the chassis gear hole and align the mounting holes.
4. Rotate and position the motor so that the motor leads are against the chassis center wall.
5. Install the three flat-head motor mounting screws (Part of **907**). Do not over-tighten.
6. Install the 31-tooth motor gear (**906**) and retaining ring (**910**). Make sure the recessed side of the gear faces out.
7. Remove the adhesive release liner on the gear cover. Install the gear cover into the recessed gear area of the recorder chassis.

A12 Printer (50 mm) Repair Procedures

Removing the Door Assembly

To remove the Door Assembly:

1. Open the door (**904**) until the door-open spring bushing (**912**) is exposed.
2. Using a screwdriver, snap out the spring bushing from the door side.
3. Deflect out the door sides over the hubs and remove the door and spring.

Installing the Door Assembly

To install the Door Assembly:

1. Insert the long leg of the door-open spring as far as possible into the hole located on the side of the recorder chassis.
2. Place the loop of the spring (**912**) over the hub on the side of the recorder chassis.
3. Flex the spring and hook the spring bushing over the edge of the chassis.
4. Place the door assembly (**904**) over the end of the recorder chassis and push until the door sides snap into place over the hubs on both sides of the recorder chassis. Make sure that the paper ejector is positioned inside the recorder chassis.
5. Using a screwdriver, push the spring bushing into the hole located inside the door side wall. Make sure that the bushing is fully seated.

A12 Printer (50 mm) Repair Procedures

Removing the Printroller Assembly

To remove the printroller assembly:

1. Deflect out the door flange adjacent to the printroller gear and remove the printroller (**909**), paper strippers (**913**), and shaft (**911**).
2. Save the paper strippers and roller shaft for reassembly.

Installing the Printroller Assembly

To install the printroller:

1. Place the roller shaft (**911**) into the printroller assembly (**909**) with the flat end opposite the printroller gear.
2. Align and position the flat end of the roller shaft, with the installed printroller, into the door D-shaped hole.
3. Snap the other end of the shaft into the door hole on the gear side of the assembly. Make sure that the roller assembly and gears will rotate freely.
4. Bend and rotate the paper strippers (**913**) into place. Make sure that the paper strippers fit loosely in the printroller slots. Remove and replace the printroller assembly if the paper strippers do not fit loosely.

A12 Printer (100 mm) Repair Procedures

This section provides instructions for repairing the A12 Printer (100 mm). Also refer to the **A12 Printer (100 mm) Parts List** to locate parts specified in these procedures.

Only the parts available for replacement are listed. Other parts are shown for reference only.

To remove the A12 Printer (100 mm) from the front case, see the **A12 Printer Assembly (100 mm) Replacement Procedure**.

Removing the Paper Cradle

Removal and installation of the paper cradle may be accomplished without removing the printer assembly from the LIFEPAK 12 defibrillator/monitor.

To remove the paper cradle (if necessary):

1. Open the recorder door.
2. Grasp the front portion of the cradle and bend it up slightly to disengage one of the front pivot pins from its hole in the printer door. With one of the front pivot pins disengaged, the other front pivot pin may be removed from its hole.
3. Tilt the paper cradle to disengage the rear pivot pins from their “S” slots.
4. Lift the cradle out of the printer.

A12 Printer (100 mm) Repair Procedures

Installing the Paper Cradle

To install the new paper cradle:

1. Position the new cradle with the long pair of pivot pins toward the inside (or rear) of the printer.
2. Slip one of the long pins (on either side) into its “S” slot. Twist or tilt the cradle slightly to engage the other long pin.
3. Lift the printer door slightly. **GENTLY** lift and bend the front of the cradle in order to seat the two shorter (front) pivot pins, one at a time.

CAUTION!

Possible Product Damage. Excessive bending may break the paper cradle or loosen the clear plastic guard.

Removing the Motor/ Gear Assembly

To Remove the Motor/Gear Assembly:

1. Remove the printer assembly from the LIFEPAK 12 defibrillator/monitor (see **A12 Printer Assembly (100 mm) Replacement** procedure).
2. Locate the connector on the red/black wire harness from the motor/gear assembly.
3. Slide the connector out from under the retaining clip, and unplug the harness from the flexible circuit.

A12 Printer (100 mm) Repair Procedures

Removing the Motor/ Gear Assembly (continued)

CAUTION!

Possible Product Damage. Be careful not to damage the flex during this operation.

4. Remove the single screw and thin washer that retains the large gear at the end of the recorder assembly. Slide the large gear off and set it aside.
5. Note the orientation of the red/black wire harness as it exits the motor.
6. Remove the three small Phillips head screws that secure the motor/gear assembly. Remove the motor/gear assembly.

Installing the Motor/ Gear Assembly

To install the new motor/gear assembly:

1. Position the new motor/gear assembly with the gear protruding through the access hole.

   Note: The side of the motor where the red/black wire harness exits must face the body of the printer.

2. Install the three small Phillips head screws that secure the motor/gear assembly.
3. Reconnect the red/black wire harness to the flexible circuit, and position the connector beneath the retainer clip, between the molded ribs.

A12 Printer (100 mm) Repair Procedures

Installing the Motor/ Gear Assembly (continued)

4. Set the large gear back in place, with the shoulder side of the gear facing the printer. Make sure that it meshes with the two small gears (on the motor and the drive roller). Reinstall the retaining screw and thin washer to secure the large gear.

Removing the Door/ Roller Assembly

To remove the Printer Door/Roller:

1. Remove the printer assembly from the LIFEPAK 12 defibrillator/monitor (see **A12 Printer Assembly (100mm) Replacement** procedure).
2. Open the printer door (after the printer assembly has been removed).
3. Remove the paper cradle (see **Paper Cradle Installation** procedure).
4. Hold the printer assembly in the left hand, or place on the work surface with the label side of the printer down.
5. **GENTLY** press inward on the bottom of the right-hand printer flange to release the right side printer door pivot pin.

CAUTION!

Possible Product Damage. Excessive pressure applied to the printer flange may deform or break the printer chassis, necessitating replacement of the printer assembly.

A12 Printer (100 mm) Repair Procedures

Removing the Door/ Roller Assembly (continued)

6. Disengage the pivot pin at the other side of the printer door, and pull out on the door to remove.

Installing the Door/ Roller Assembly

Install the new door/roller assembly as follows:

1. Engage the pivot pin on the left side of the printer door.
2. **GENTLY** press inward on the flange at the right side of the printer, and slip the right pivot pin on the printer door into place.

CAUTION!

Possible Product Damage. Excessive pressure applied to the printer flange may deform or break the printer chassis, necessitating replacement of the printer assembly.

3. Reinstall the paper cradle (see **Paper Cradle Installation** procedure).

LIFEPAK 12 Voice Recorder Installation/Removal

Installing the LIFEPAK 12 Voice Recorder

Install the LIFEPAK 12 voice recorder assembly as follows:

1. Align the LIFEPAK 12 voice recorder connector with the LIFEPAK 12 defibrillator/monitor system connector (located on the rear of the LIFEPAK 12 defibrillator/monitor).
2. Connect the LIFEPAK 12 voice recorder connector to the LIFEPAK 12 defibrillator/monitor system connector. Ensure that the alignment pin near the top of the voice recorder is inserted into the locating hole on the back of the LIFEPAK 12 defibrillator/monitor and verify that no wires are pinched between the voice recorder and the LIFEPAK 12 defibrillator/monitor.
3. Mount the voice recorder with two 6-32 × .375 screws, PN 201407-069.

Removing the LIFEPAK 12 Voice Recorder

Remove the LIFEPAK 12 voice recorder assembly as follows:

1. Remove the two 6-32 × .375 screws (PN 201407-069) that secure voice recorder assembly to the LIFEPAK 12 defibrillator/monitor
2. Pull the voice recorder assembly straight back, disconnecting the LIFEPAK 12 voice recorder connector from the LIFEPAK 12 defibrillator/monitor system connector.

Parts Lists and Assembly Diagrams

The Parts List and Assembly Diagrams section is a hierarchical reference used to identify components needed to repair the LIFEPAK 12 defibrillator/monitor.

Navigation with the Parts List and Assembly Diagram Configurators

Section Glossary

Assembly Drawing Configurator

Parts List Configurator

Edmark Interconnect Drawing

Biphasic Interconnect Drawing

Service Replacement Kits

Defibrillator Part Number and Serial Number

How to Order Parts

Defibrillator devices with the SpO2 option manufactured before publication of this service manual have different parts than the ones shown. Defibrillator devices with 50 mm Printer PN 3011714-00 have different parts than the ones shown. For those devices see Service Manual part number 3010013-00.

Parts Lists and Assembly Diagrams

Navigation with the Parts List and Assembly Diagram Configurators

Answering questions for your device as configurated guides you to the correct assembly. Clicking on the item number displays a parts list with the part number that corresponds to that item number. Clicking on the item number in the parts list displays a detail drawing of the part in a typical context.

1. From the Section Contents (previous page), click on the link “Assembly Drawing Configurator.”
2. Click on one of the links presented to you (“Front Case,” “System/Memory/Therapy PCB,” “Rear Case,” or “Options”) applicable to your part.

If you know the part number that you are looking for, you can skip the Assembly Drawing Configurator and go directly to the parts list by clicking on the “Parts List Configurator.” Follow step 2 above.

The Parts Lists Configurator leads you to the replaceable parts that are applicable to your device with your specific options. The parts lists are organized by assemblies: Front Case, PCB Assemblies, Rear Case, and Optional Parts.

Parts List and Assembly Diagrams

Language options are displayed in the **notes** column of each parts list. Click on the text **Select other language** for a listing of part numbers for German, French, and other languages.

The **A12 Printer (50 mm) Assembly Drawing** and **A12 Printer (50 mm) Parts List** provide exploded views to visually locate each item.

The **Interconnect Drawing—Edmark** or the **Interconnect Drawing—Biphasic** provides detailed interconnect information for each assembly and cable, with reference designations, e.g., A01 System PCB, W05 Power PCB/Contact PCB Cable, etc.

The **Service Repair Kits** contain all items needed to replace major components. Each kit has its own Part Number.

The **Serial Number and Part Number** description is useful for decoding the Part Number on the label, which displays the device manufacturing code.

Refer to **How to Order Parts** to obtain replacement parts for the device.

For additional parts lists, including items necessary to keep the device in clinical service, see **Ordering Devices, Supplies, and Accessories**.

Parts Lists and Assembly Diagrams

Section Glossary

- **Common Parts** are components used in every version of the defibrillator device, regardless of options and operating language. Common Parts are divided into Front Case, Rear Case, System/Memory/Therapy PCB Assembly.
- **Internal Parts** are components internal to the case that are specific to your device. Click on a part number to display the list of items or on an item number to jump to the associated Assembly Drawing.
- **External Parts** are components external to the case that are specific to your device.
- An **Item** is the reference designator for each unique part on the defibrillator device. Most major parts have detail drawings included. View them by clicking on the item number.
- The **Quantity** identifies how many of the listed part is used in the assembly at the heading of the list.
- **Part Number** refers to the Medtronic Physio-Control part number.
- **Part Description** is a brief description of the part in this row.
- **Defibrillator Part Number** is the number that identifies the model of each device.

Parts Lists and Assembly Diagrams

Section Glossary (continued)

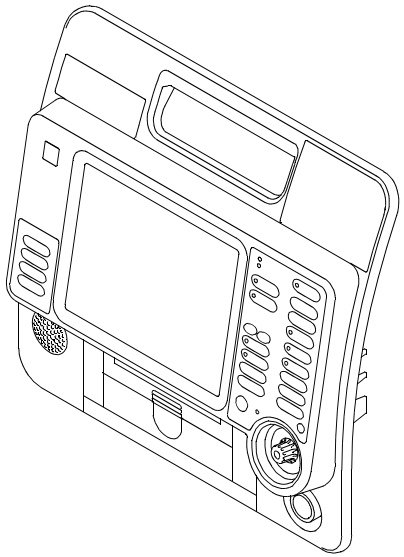
- **Options** are assemblies that are not required on the basic defibrillator device and can be specified by the customer when purchased. Parts on these assemblies may be referred to as optional parts.
- A **Reference Designator** is similar to an item number and designates that the part is a main component and a detail drawing of that part is also included. Reference Designators begin with a letter.

Assembly Drawing Configurator

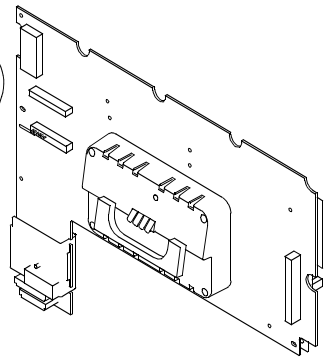
Introduction

Assembly Drawings are divided into three categories. For specific Optional Assemblies use the Configurator.

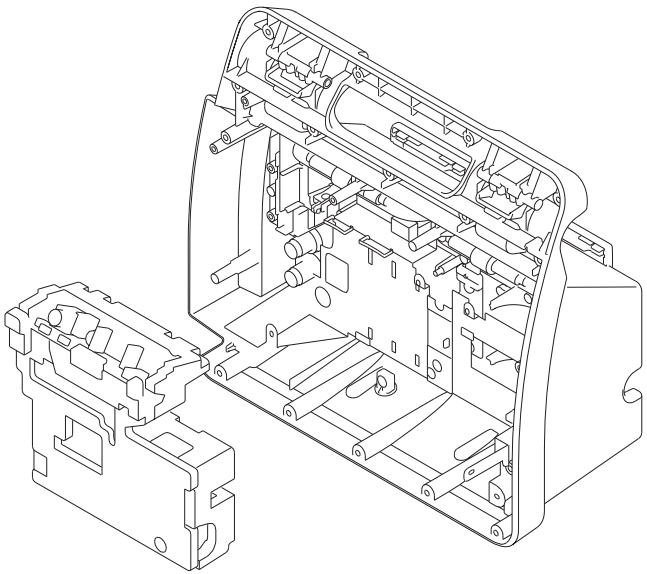
Front Case Assembly Drawing



System/Memory/ Therapy PCB Assembly Drawing



Rear Case Assembly Drawing— Edmark or **Biphasic**



Configurator: Device Optional Assemblies

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Assembly Drawing Configurator

Device Optional Assemblies

A06 OEM PCB

A11 EL Display Assembly

A11 LCD Assembly

A16 SpO2 Module

A21 NIBP Module

A23 CO2 Module

W28 CO2 Connector Assembly

W33 IP Connector Assembly

Manual Operation (No Advisory) (Keypad and Software only)

50 mm Printer

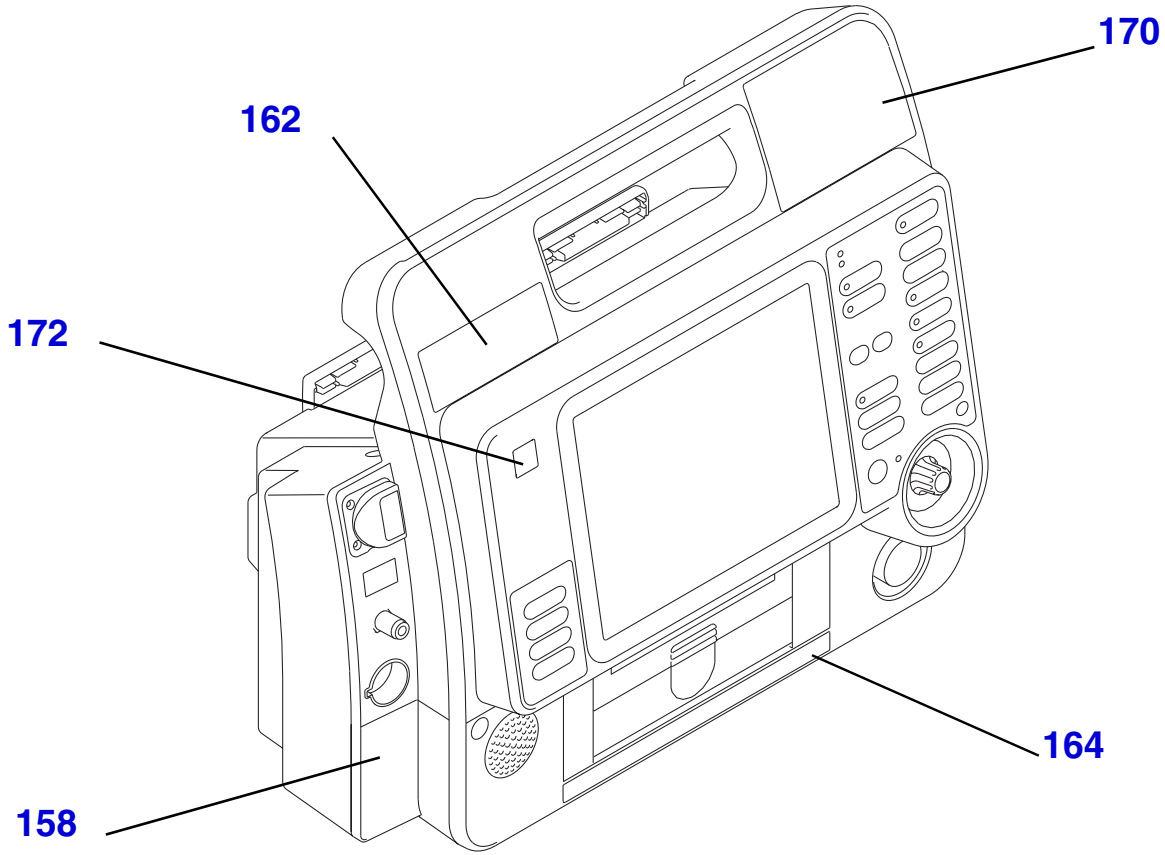
100 mm Printer (Components not shown)

Standard Paddles Assembly

Front Case Assembly Drawings

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.

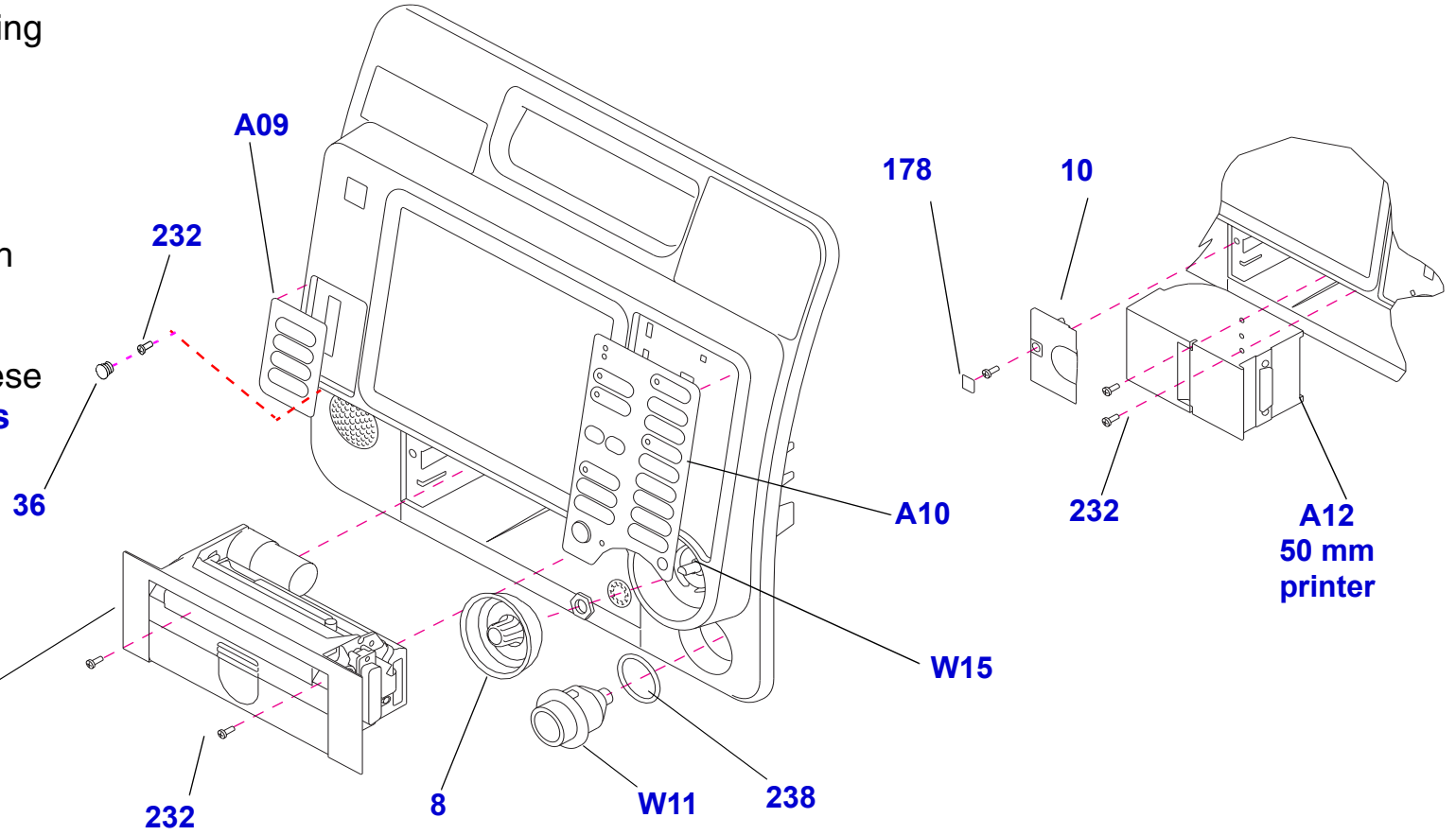


Front Case Assembly Drawings

Common Case Parts Only

Click on an item number to see the corresponding part number. View the **EL** or the **LCD** case parts.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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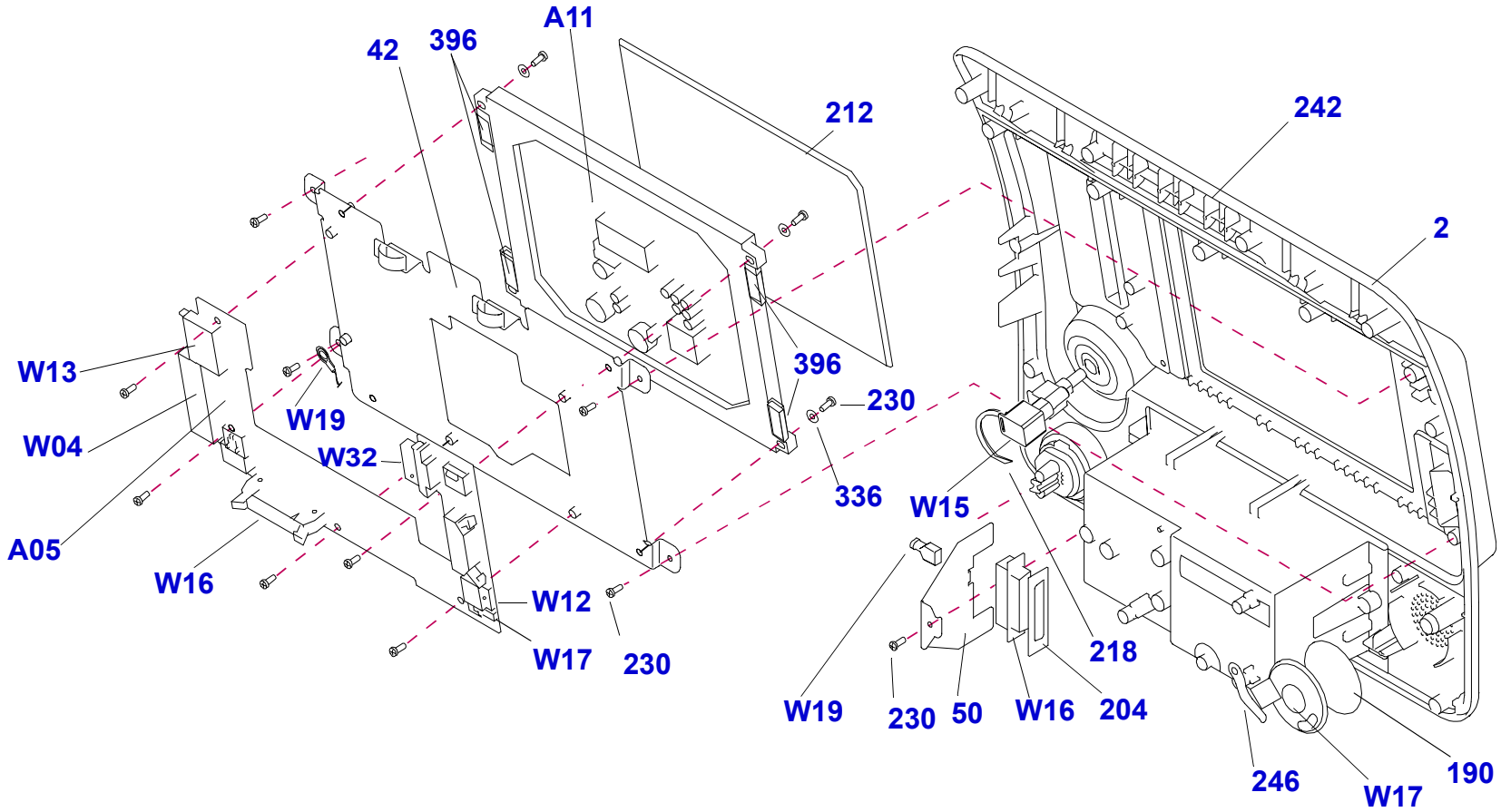
Front Case Assembly Drawings

EL Display Devices Only



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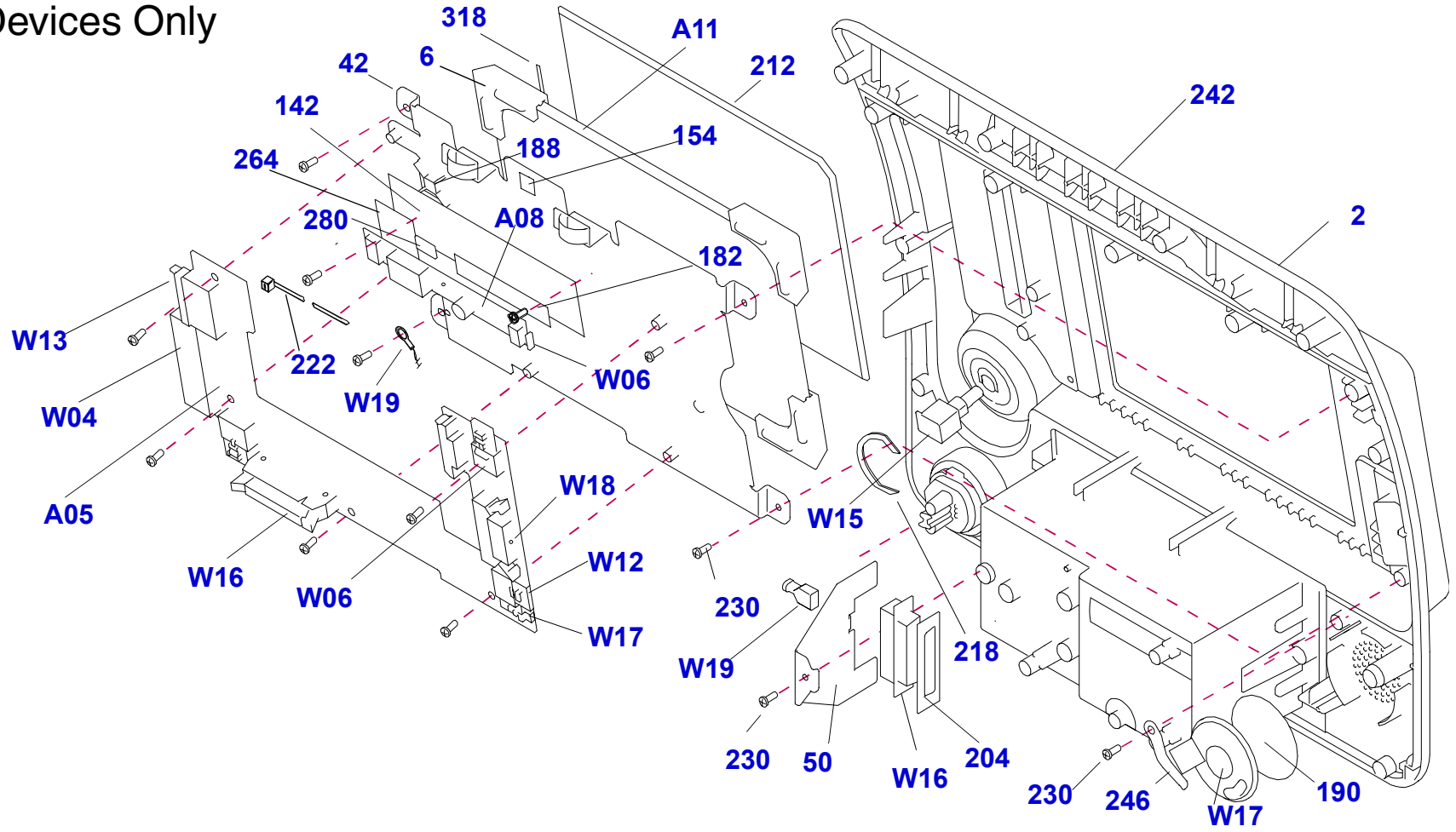
Front Case Assembly Drawings

LCD Devices Only



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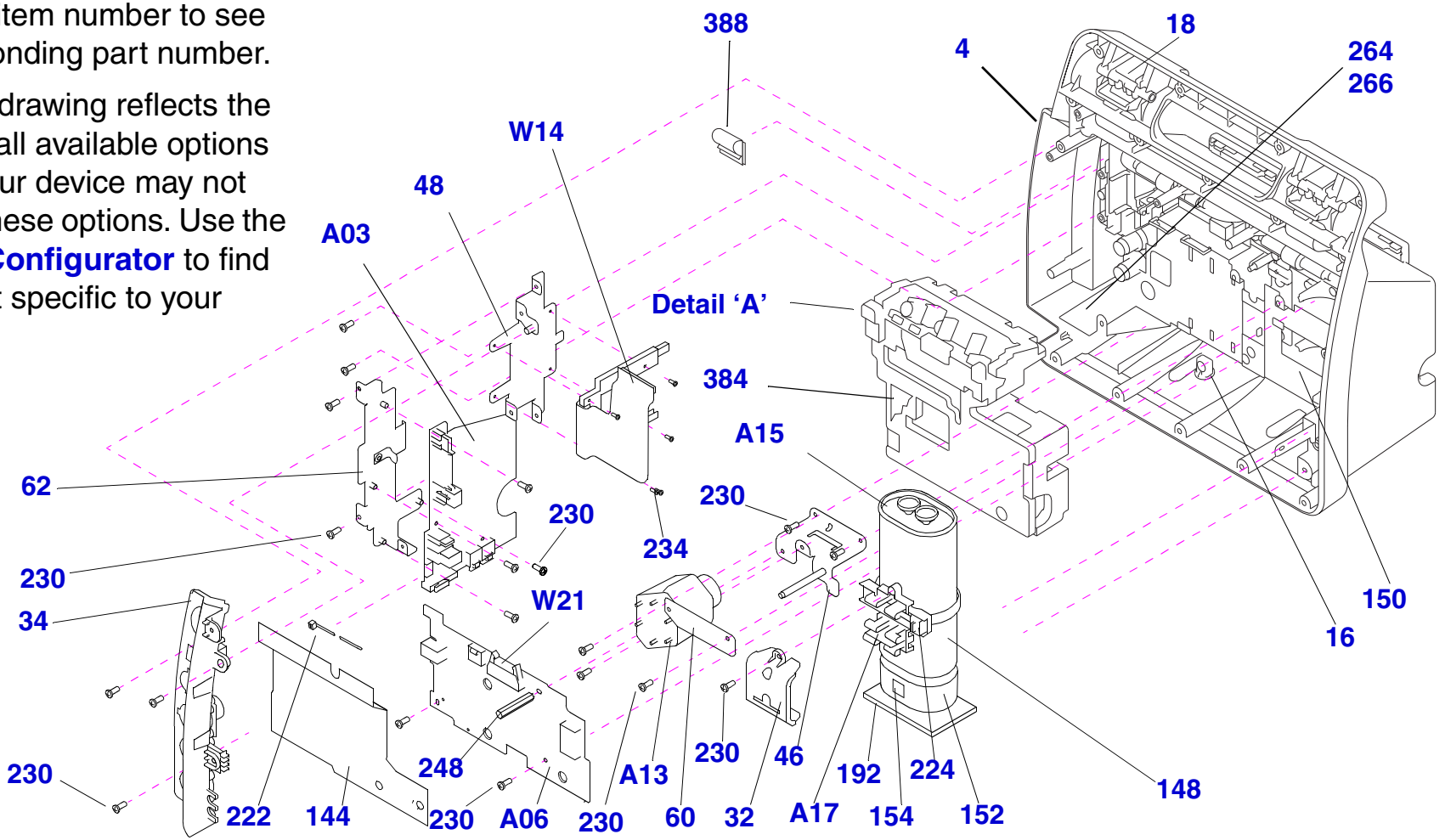
Rear Case Assembly Drawings

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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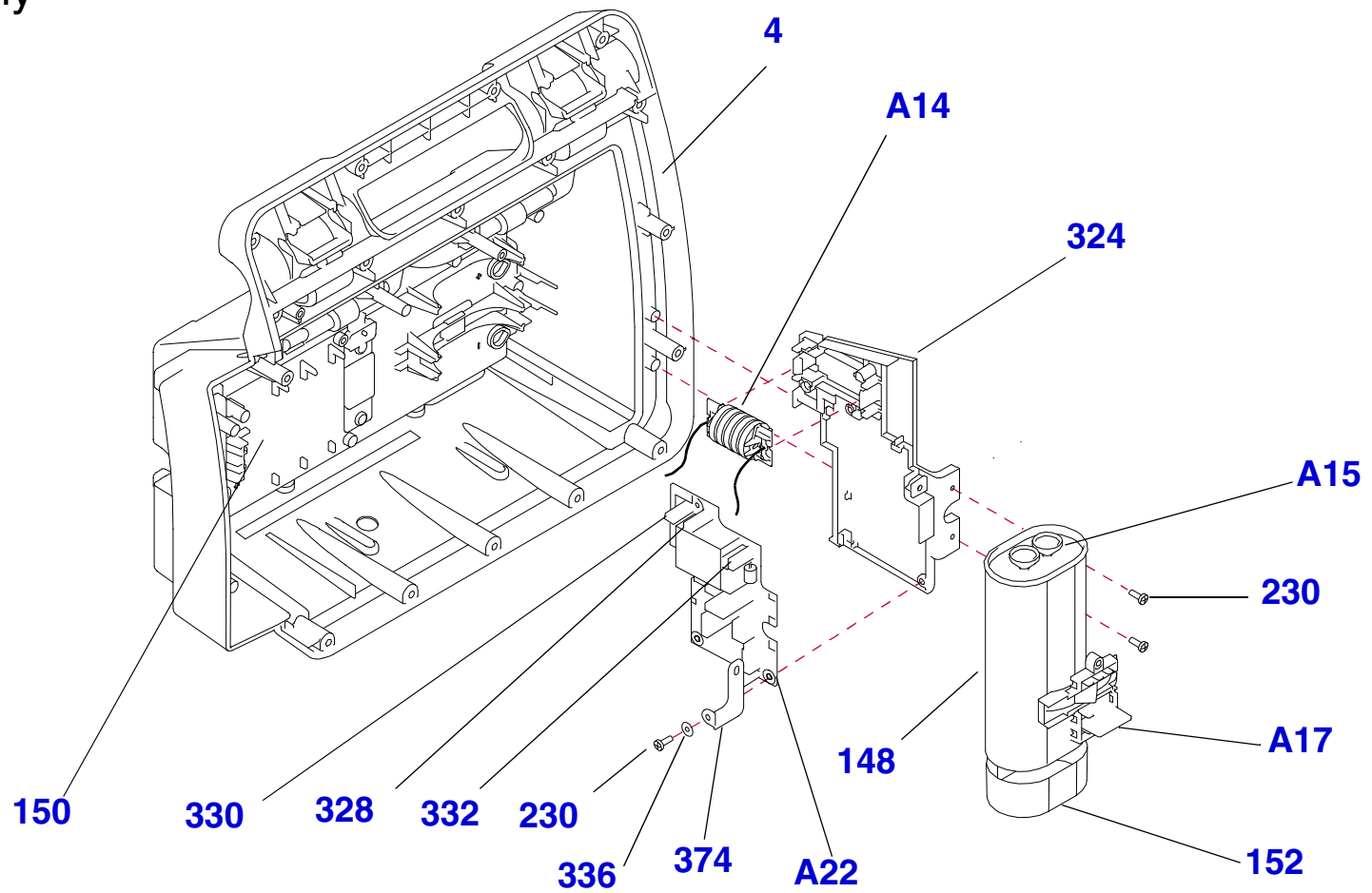
Rear Case Assembly Drawings

Biphasic Devices Only



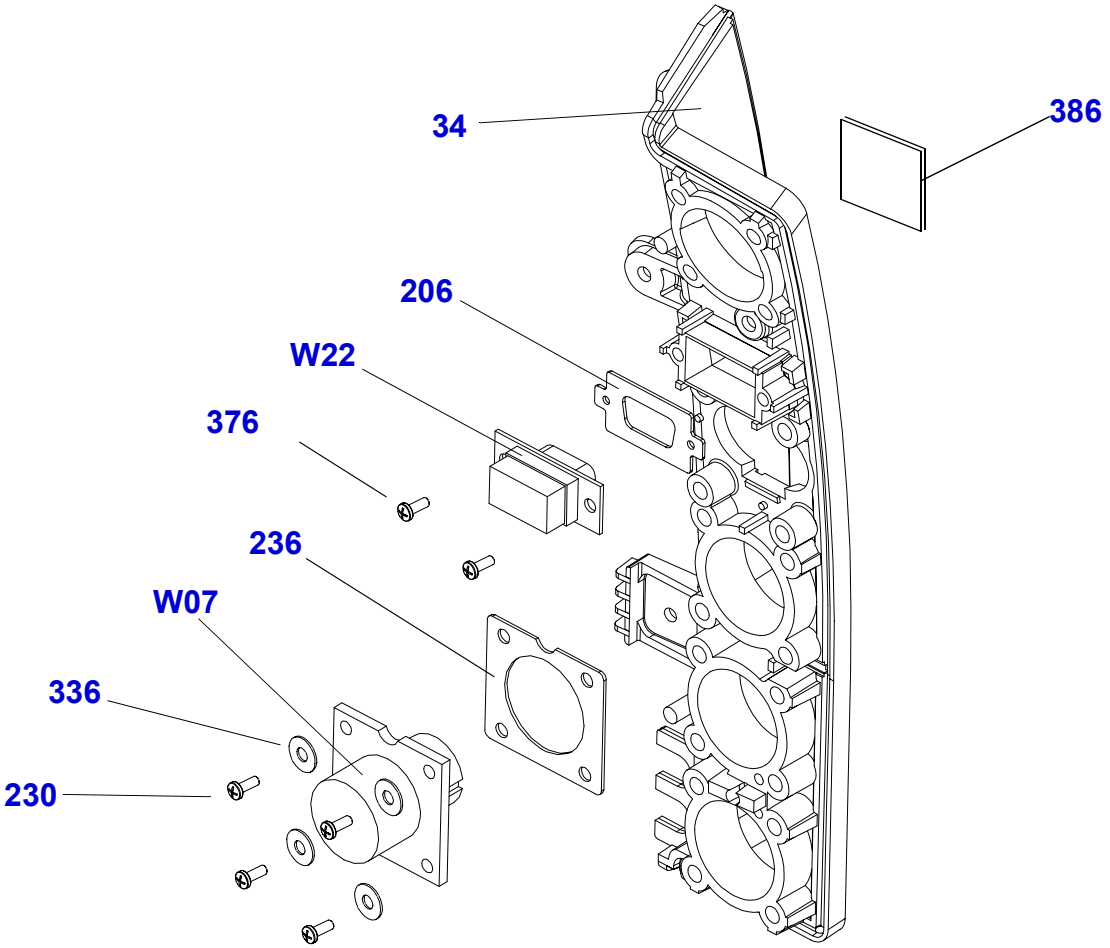
555

Rear Case Assembly Drawings

Bezel with ECG shown and SpO2 option shown

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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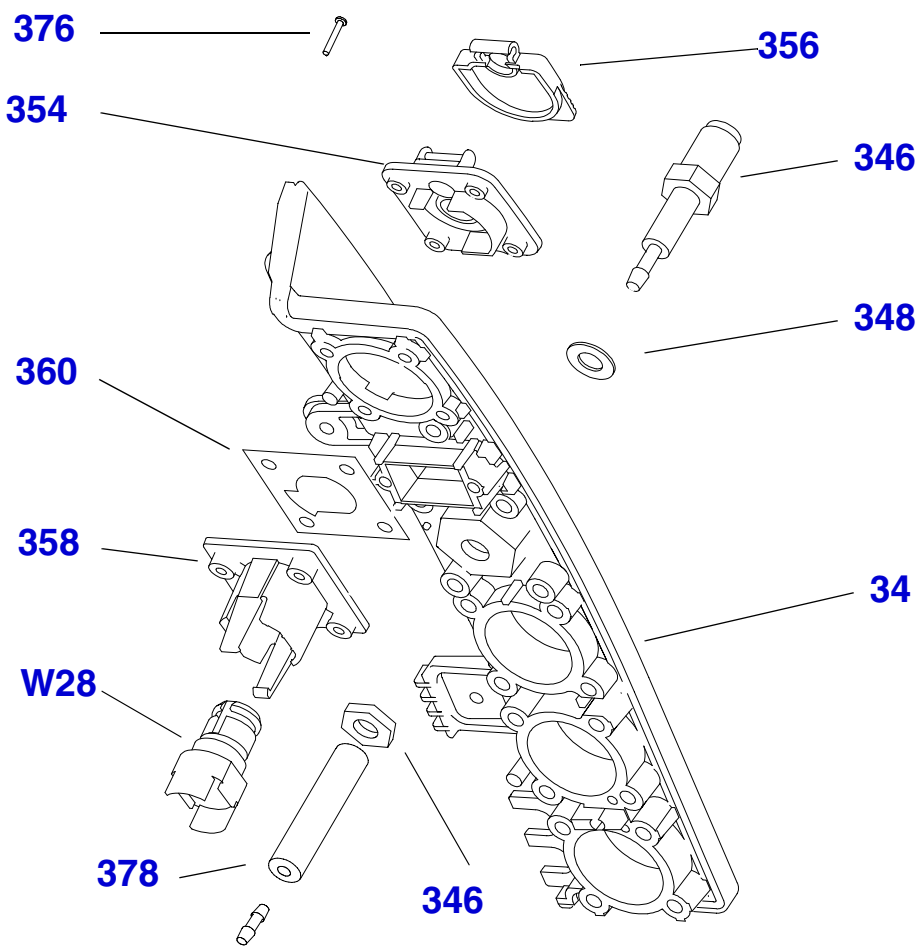
Rear Case Assembly Drawings

Bezel with CO2 and NIBP options shown

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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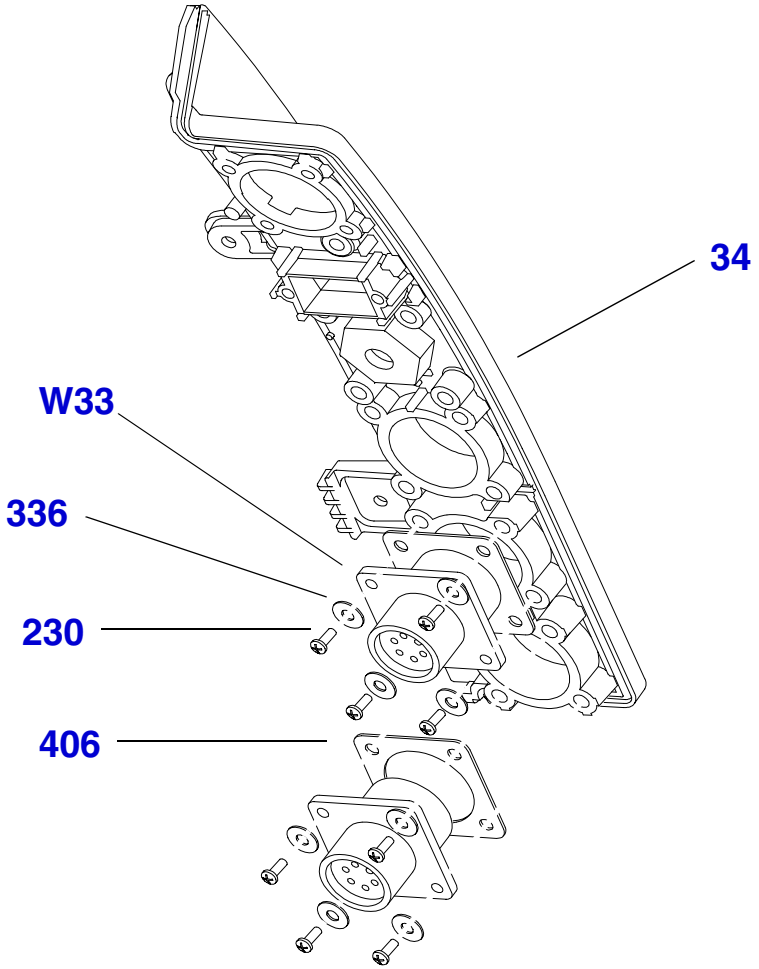
Rear Case Assembly Drawings

Bezel with IP option shown

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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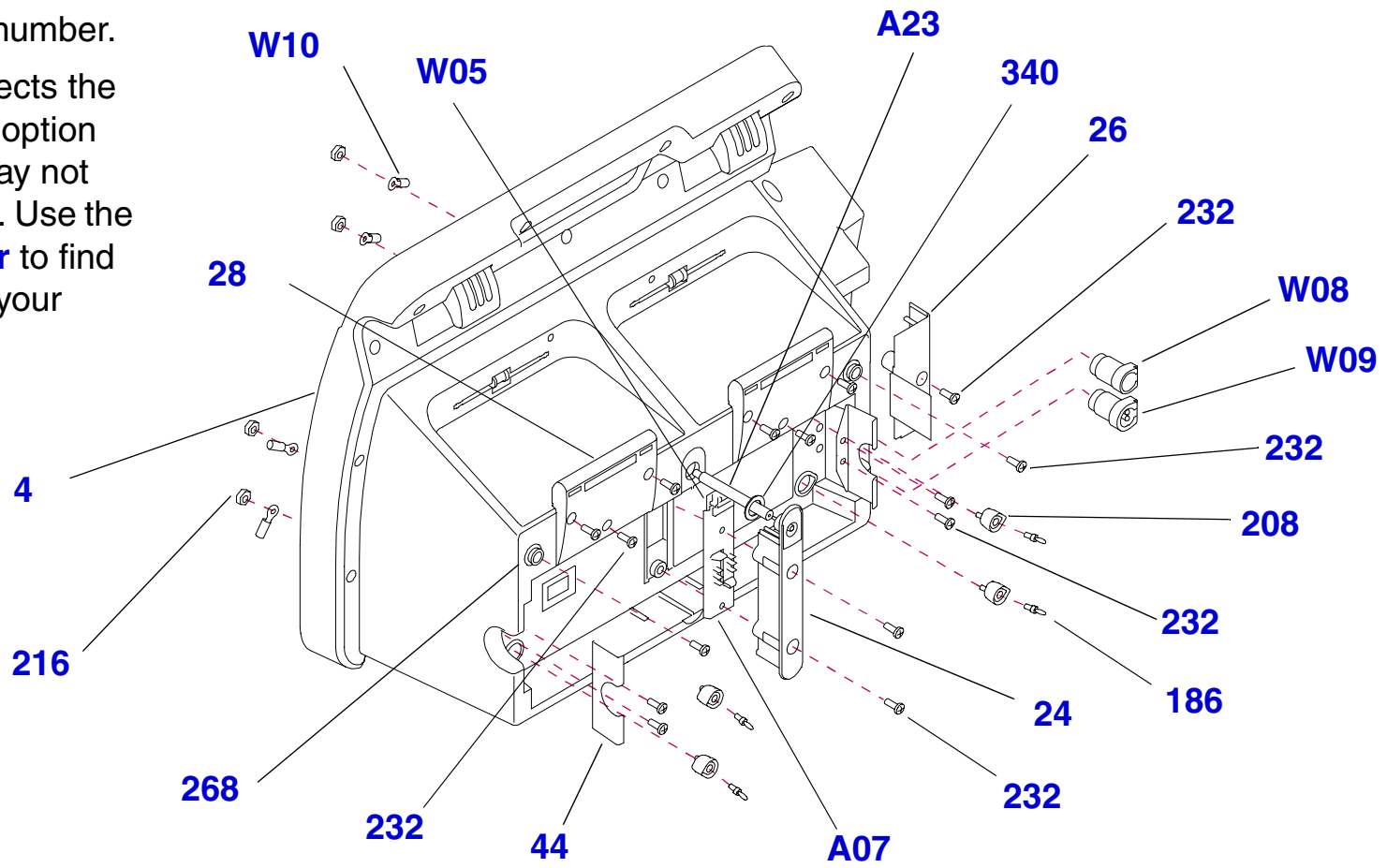
Rear Case Assembly Drawings

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available option installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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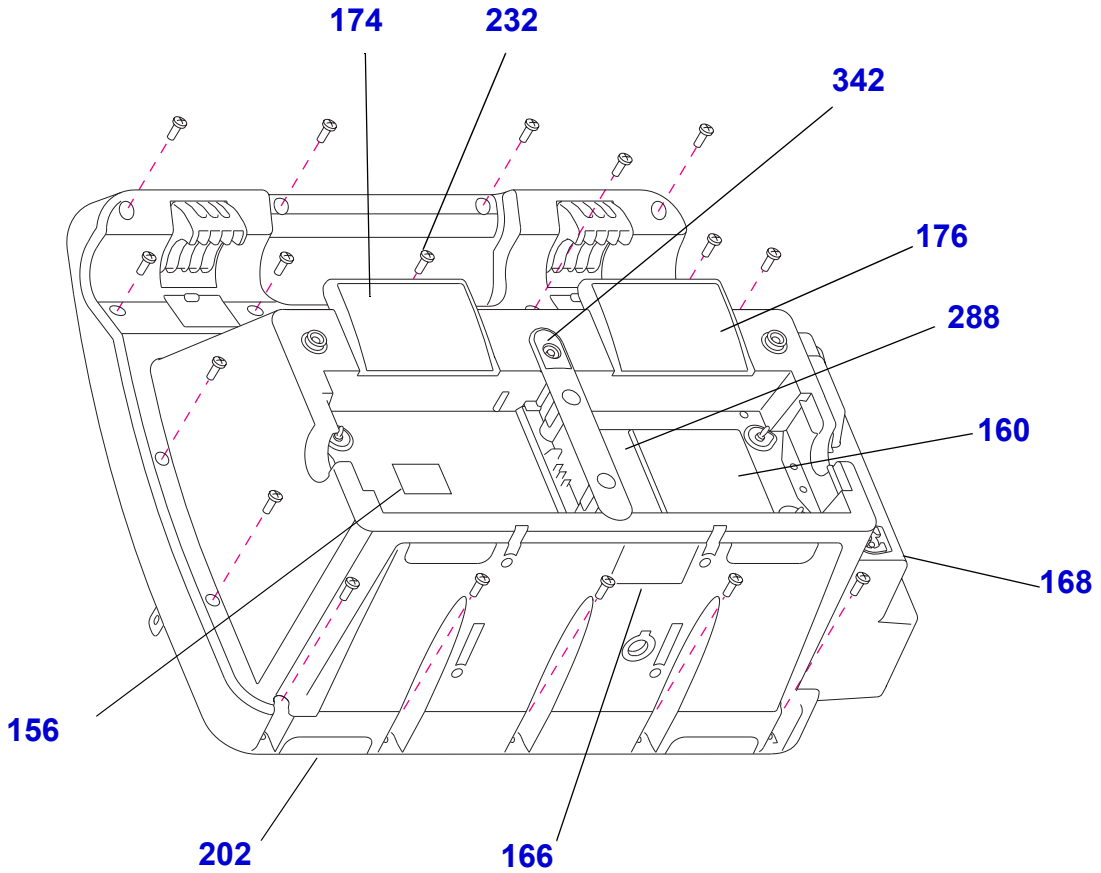
Rear Case Assembly Drawings

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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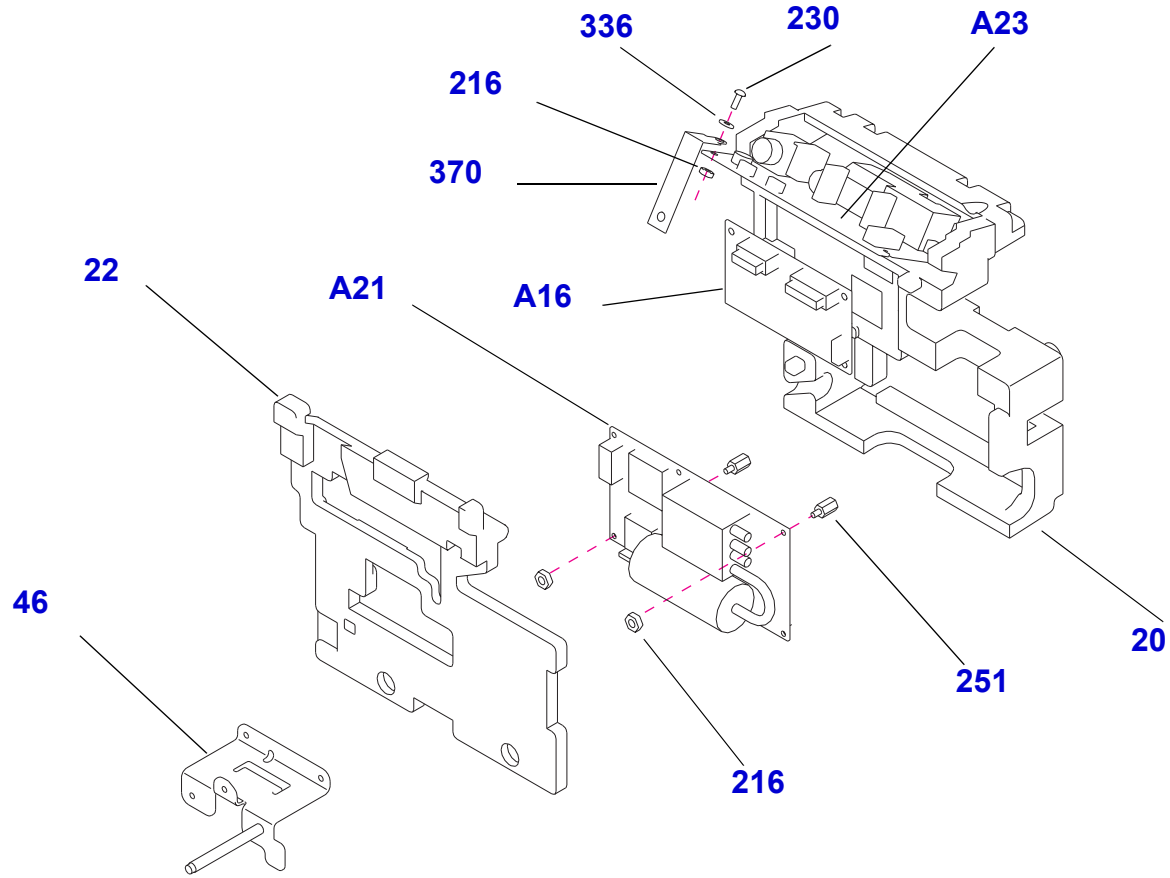
Rear Case Assembly Drawings

Detail A

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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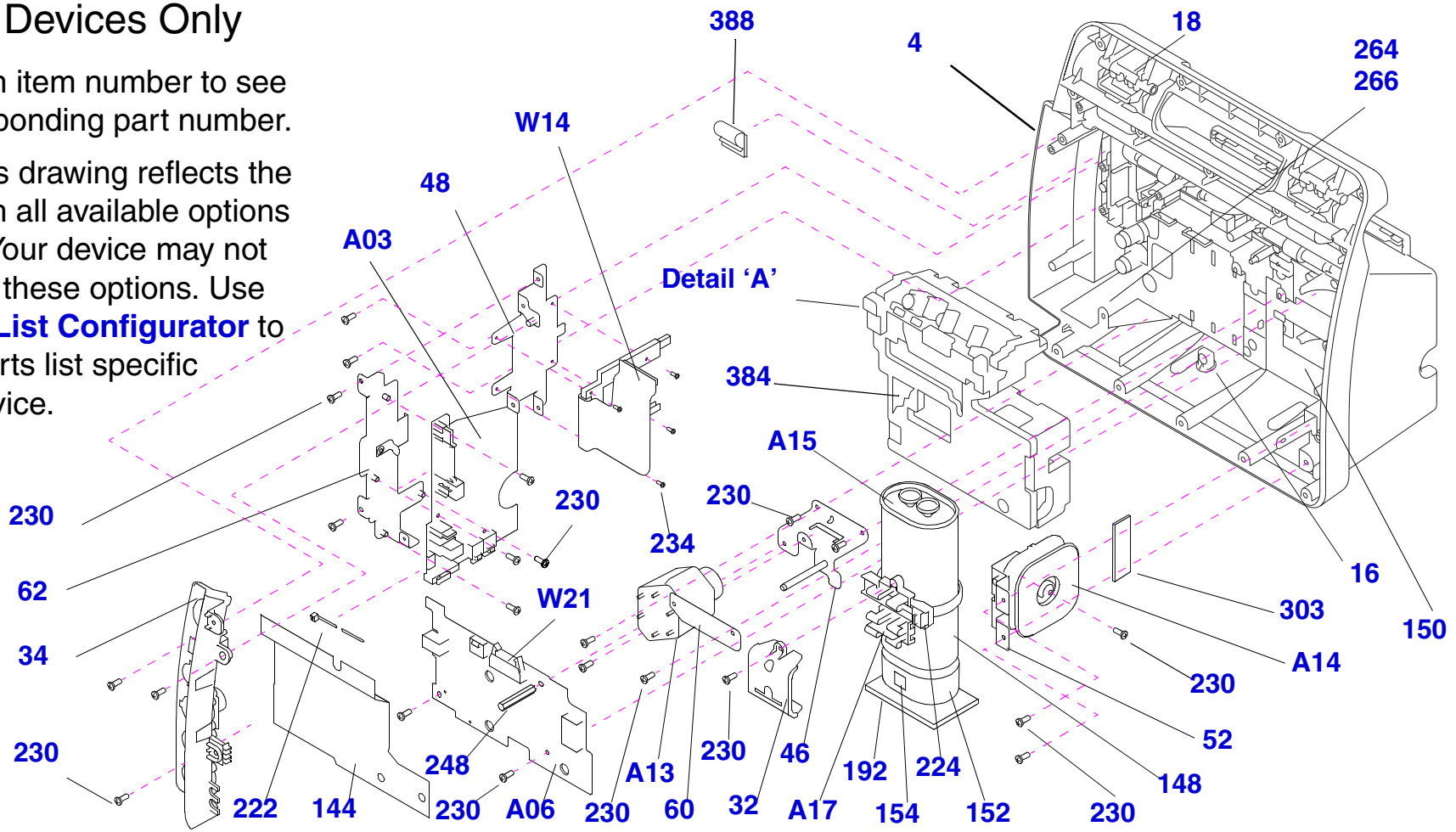
Rear Case Assembly Drawings

Edmark Devices Only

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



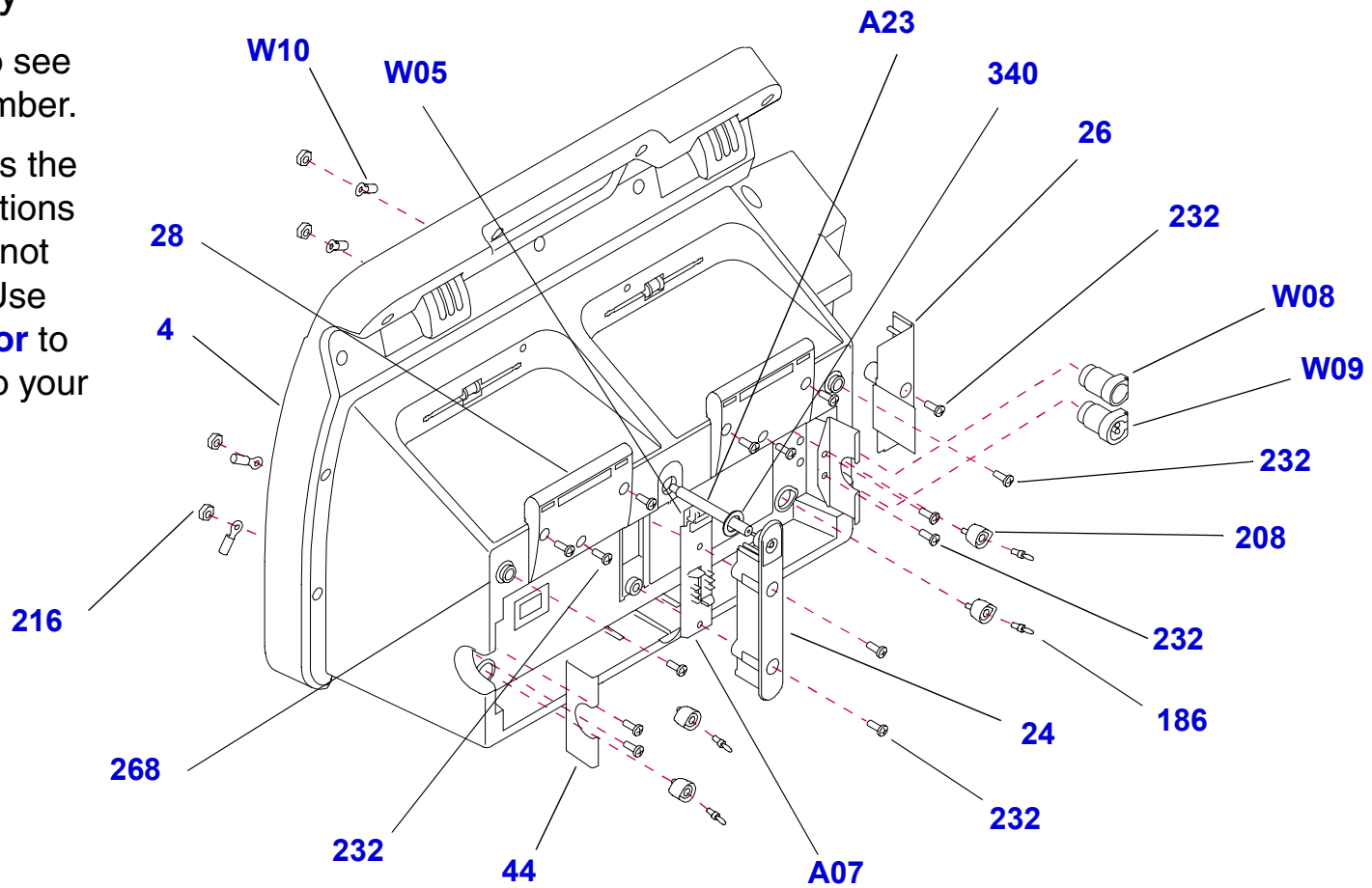
562

Rear Case Assembly Drawings

Edmark Devices Only

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



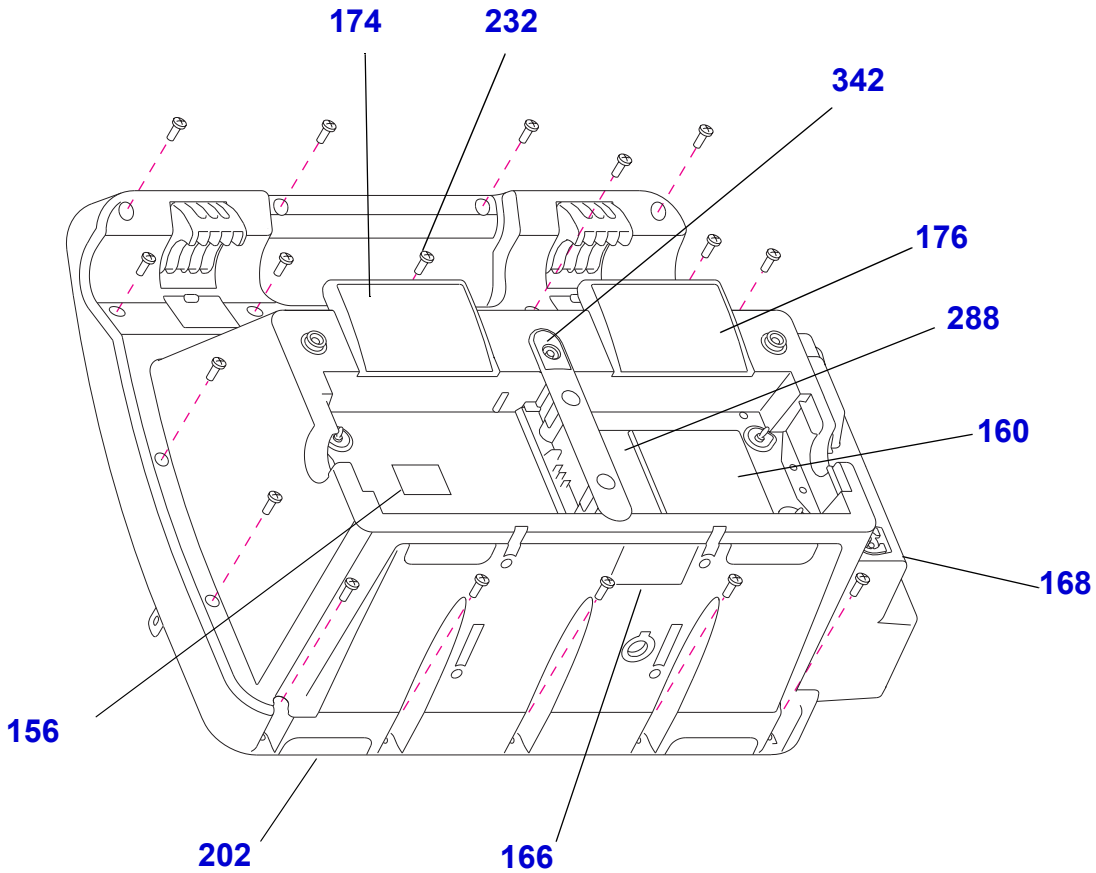
563

Rear Case Assembly Drawings

Edmark Devices Only

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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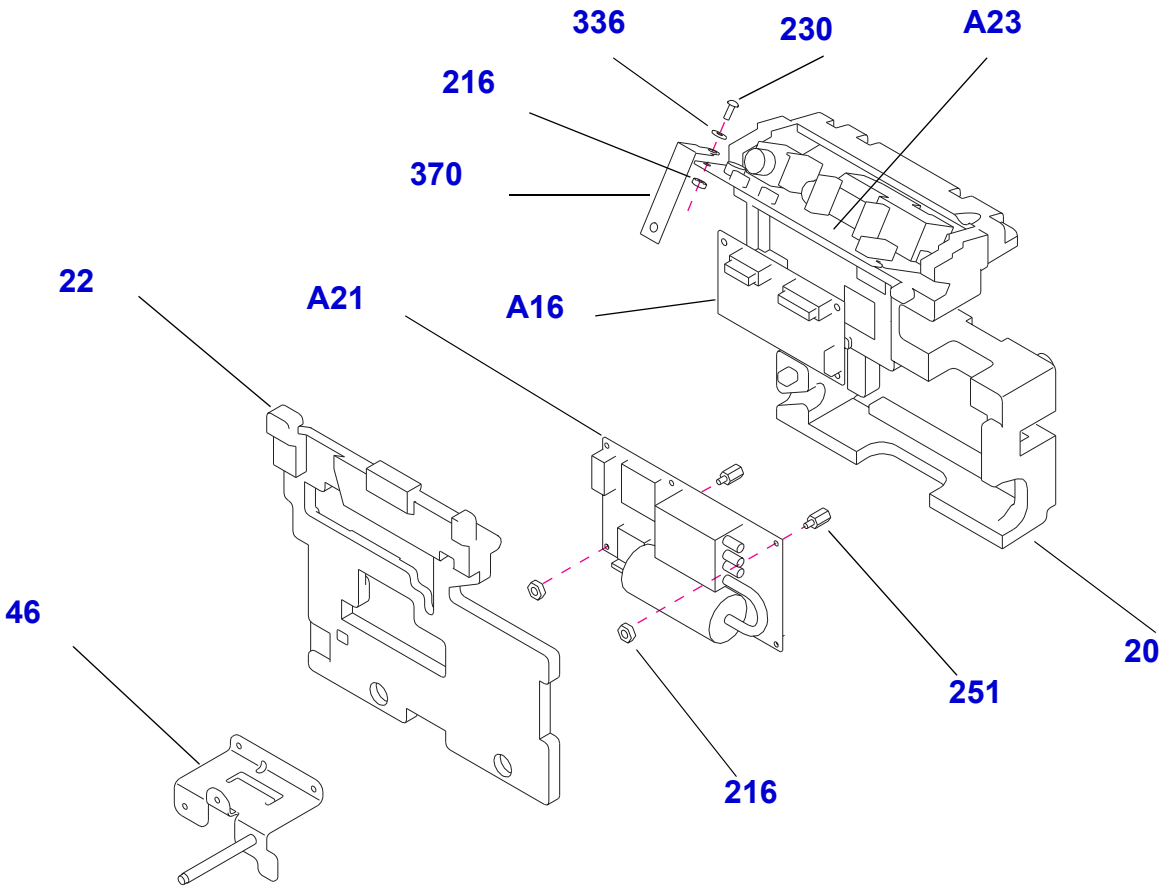
Rear Case Assembly Drawings

Edmark Devices Only
Detail A

Click on an item number to see the corresponding part number.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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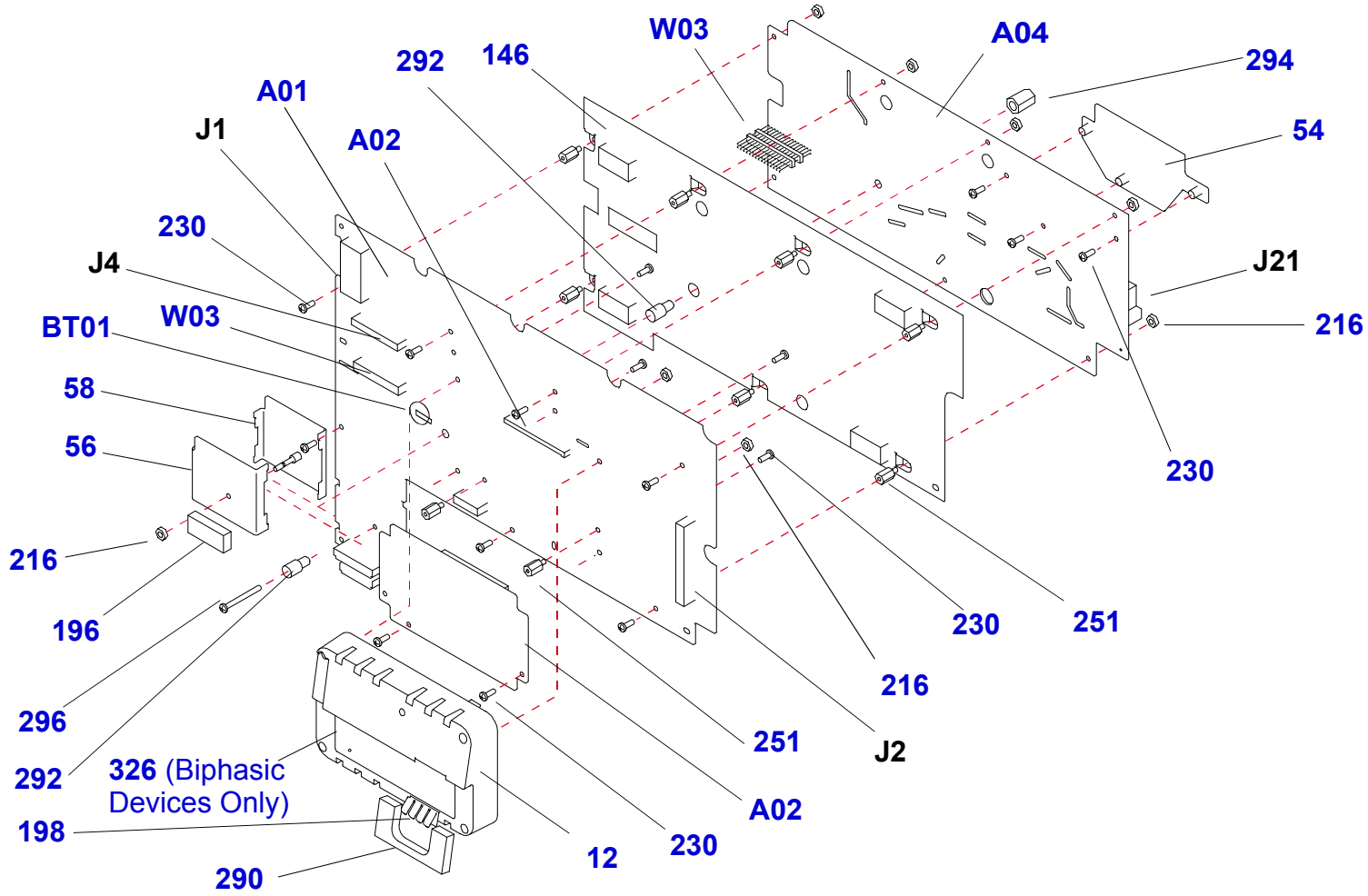
System/Memory/Therapy PCB Assembly Drawing



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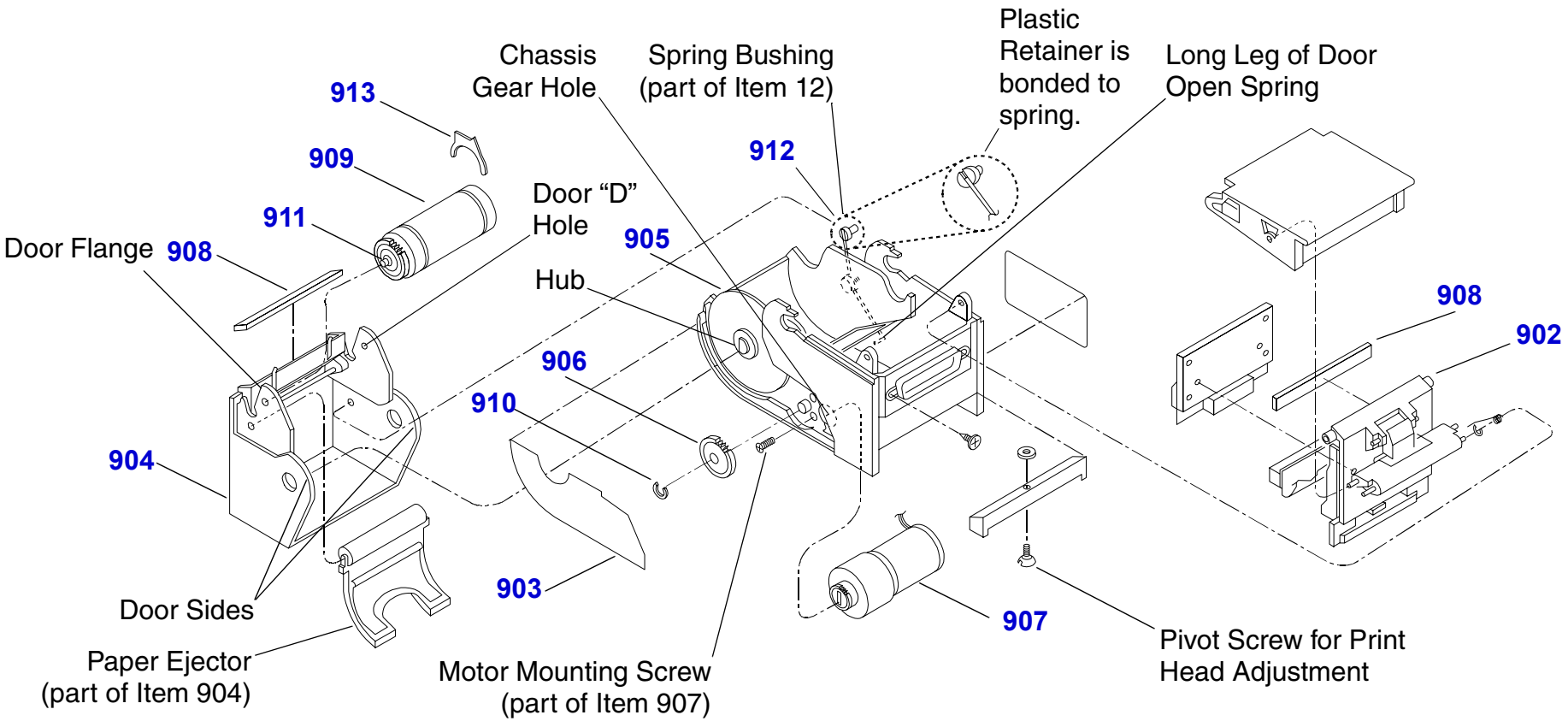
A12 Printer (50 mm) Assembly Drawing



Note: Parts without item numbers are shown for reference only and are not available for replacement.

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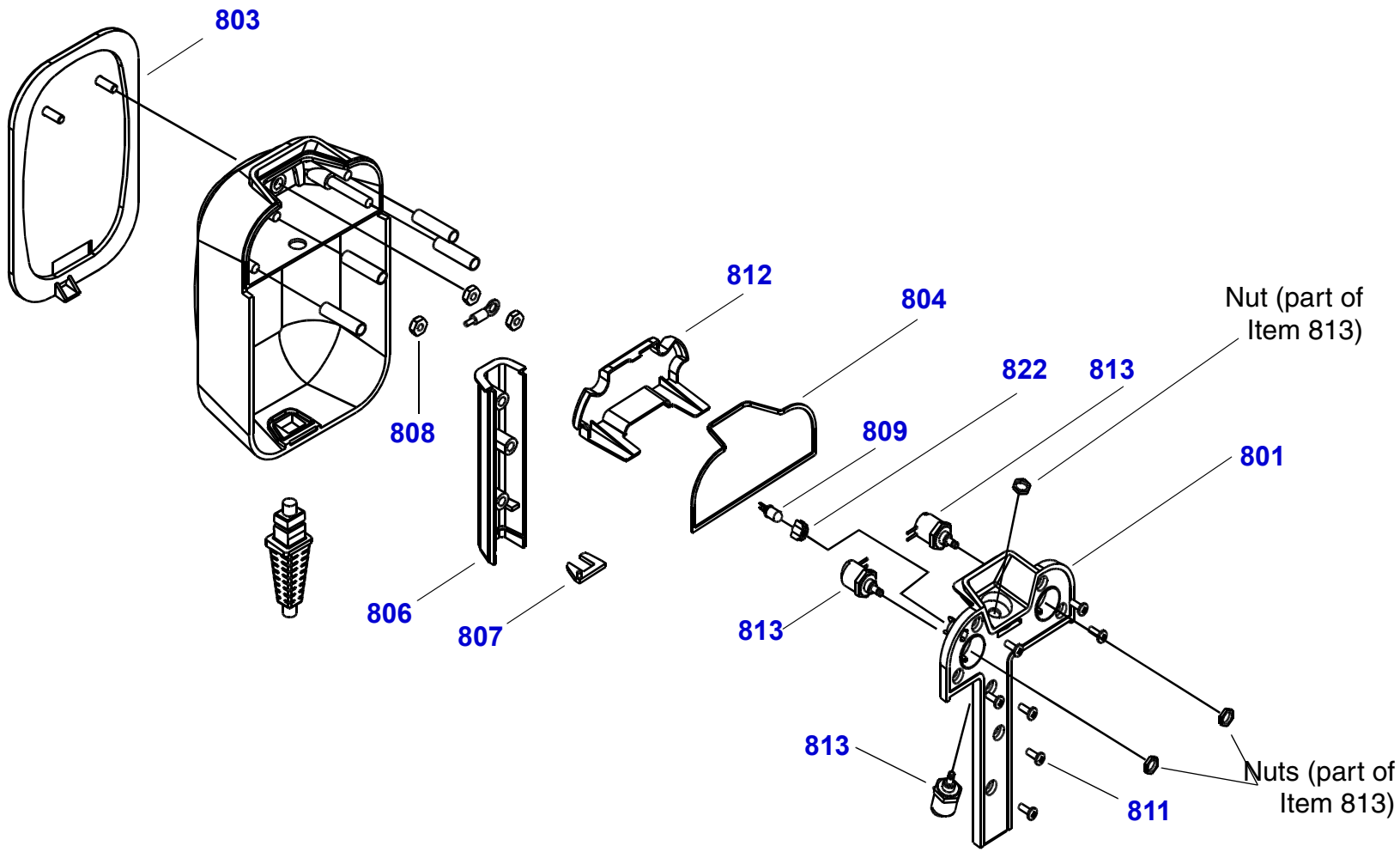
Standard Paddle Assembly Drawing

Apex

Note: See the **Parts List** for language-specific label information.

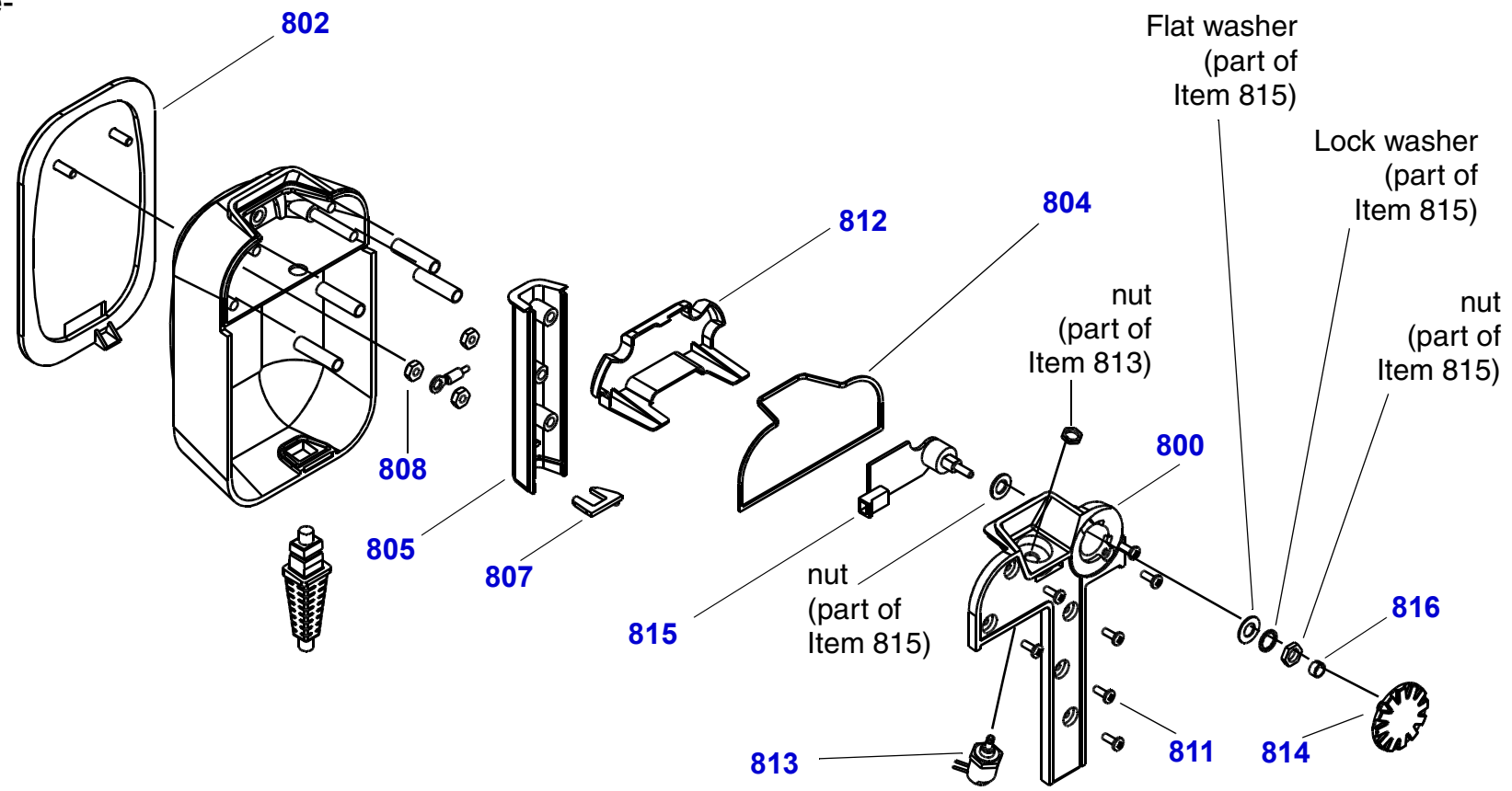


568

Standard Paddle Assembly Drawing—Sternum

Sternum

Note: See the **Parts List** for language-specific label information.



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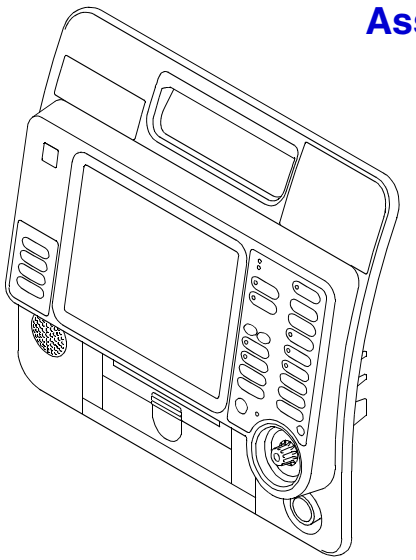
Parts List Configurator

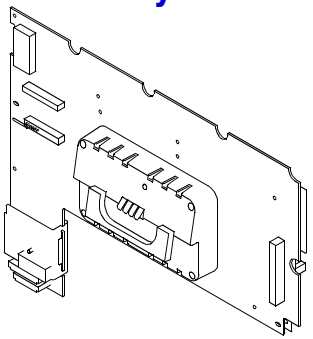
Introduction

Common Parts are divided into three categories. For Optional Parts, use the Configurator. The Configurator takes into account installed options and leads you to a listing of the parts in your device.

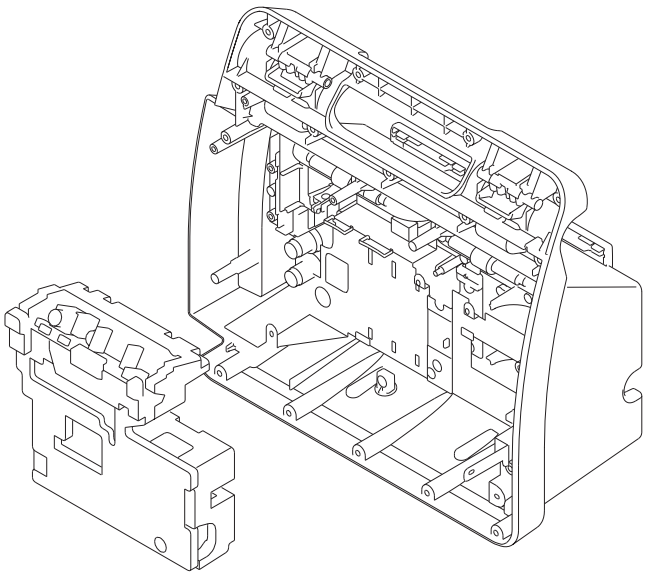
Front Case: Common Parts Only



System/Memory/ Therapy PCB Assembly: Common Parts Only



Rear Case: Common Parts Only—Edmark or **Biphasic**



Configurator: Device Optional Parts
includes printers and labels

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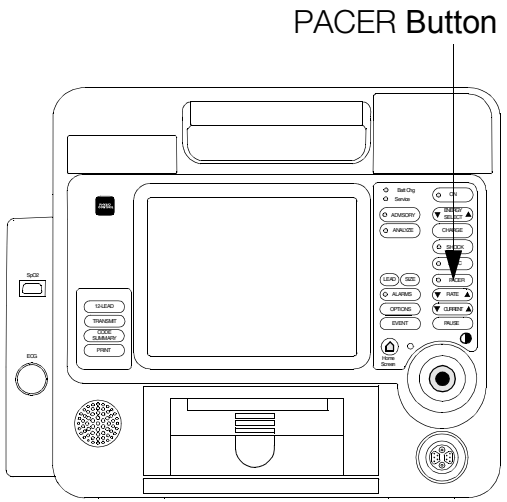
Parts List Configurator

Pacing Option?

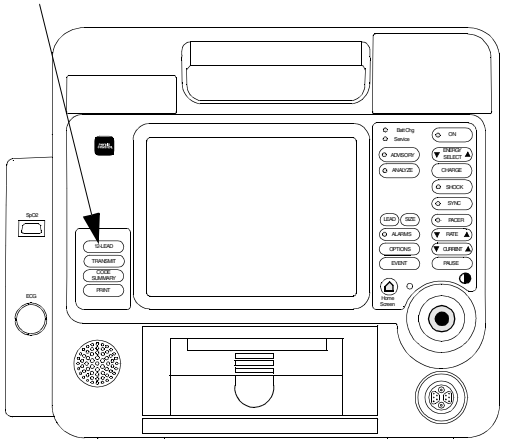


Does your device have a PACER Button?	
Yes	No

Parts List Configurator

12-Lead Control?

“12-Lead” Button



Does your device have a PACER Button?	
Yes	

Does your device have a 12-Lead Button?	
Yes	No

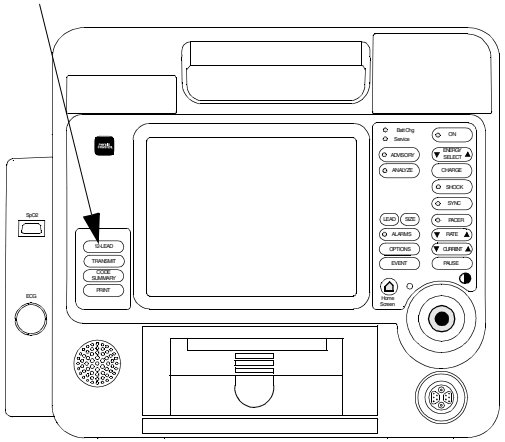
Start Over

572

Parts List Configurator

12-Lead Control?

“12-Lead” Button



Does your device have a PACER Button?	
	No

Does your device have a 12-Lead Button?	
Yes	No

Start Over

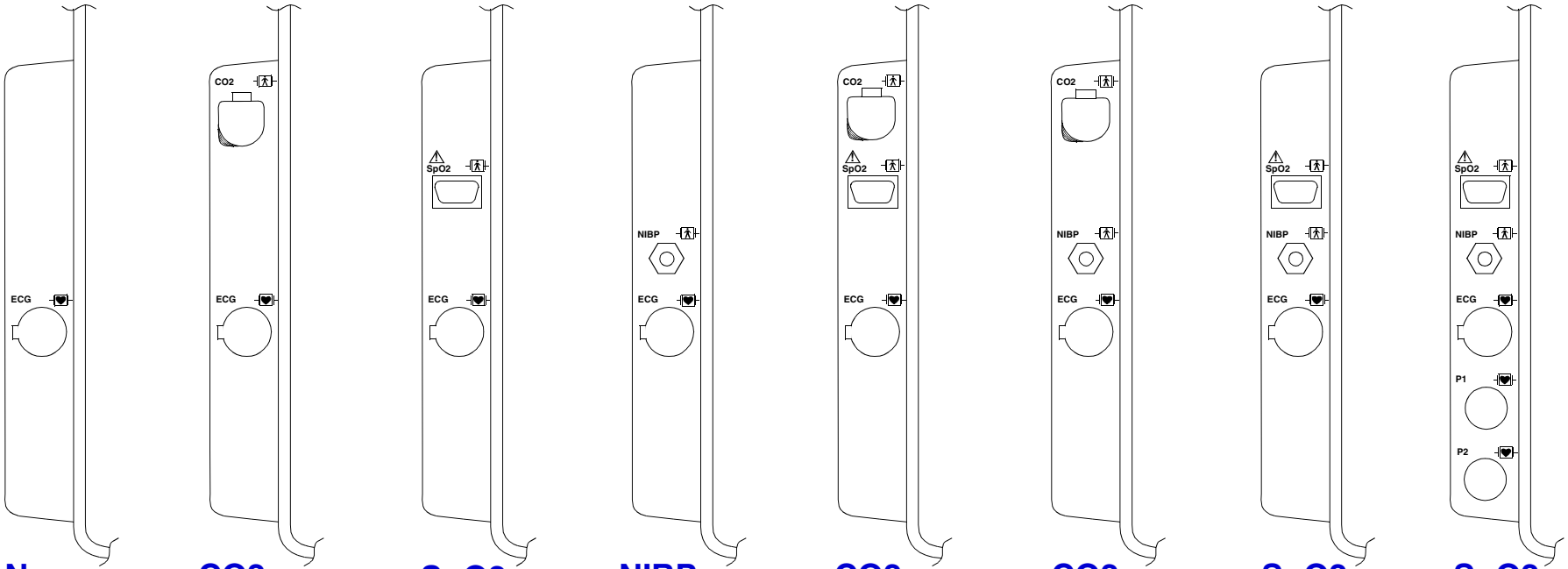
573

Parts List Configurator

No Pacer, 3-Lead

Choose the appropriate bezel.

Go to Bezel Label Parts List



No other Options | **CO2** | **SpO2** | **NIBP** | **CO2 and SpO2** | **CO2 and NIBP** | **SpO2 and NIBP** | **SpO2, NIBP, and IP**

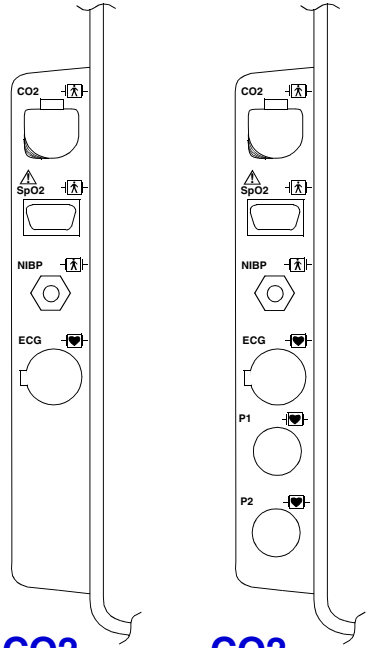
574

Parts List Configurator

No Pacer, 3-Lead (continued)

Choose the appropriate bezel.

Go to Bezel Label Parts List



CO2, SpO2, and NIBP

CO2, SpO2, NIBP, and IP

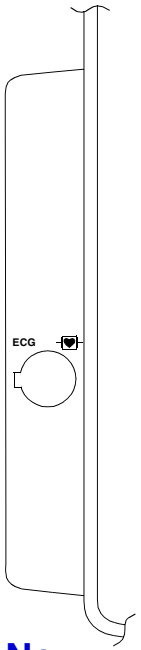
575

Parts List Configurator

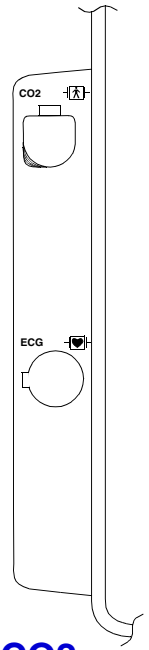
No Pacer, 12-Lead

Choose the appropriate bezel.

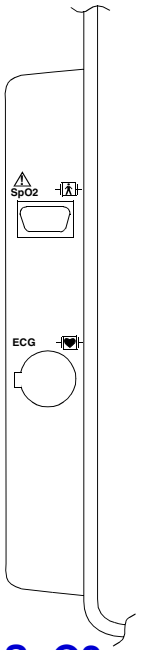
Go to Bezel Label Parts List



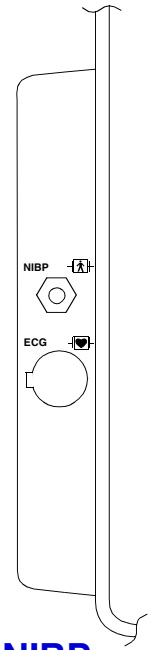
No other Options



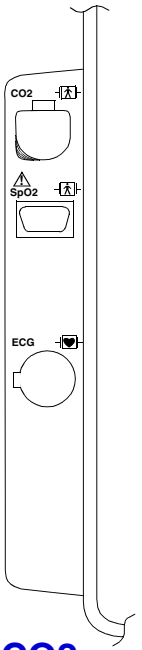
CO2



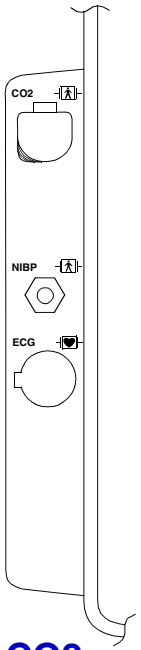
SpO2



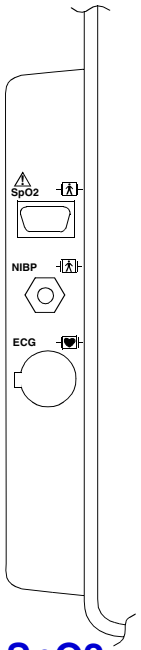
NIBP



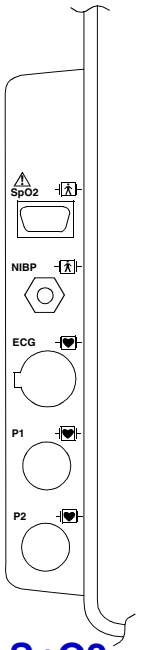
CO2 and SpO2



CO2 and NIBP



SpO2 and NIBP



SpO2, NIBP, and IP

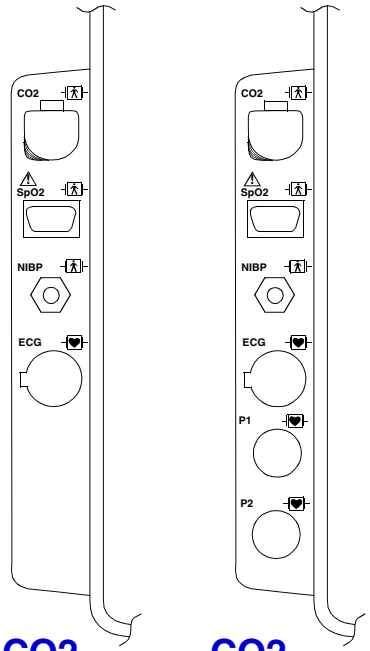
576

Parts List Configurator

No Pacer, 12-Lead (continued)

Choose the appropriate bezel.

Go to Bezel Label Parts List



CO2, SpO2, and NIBP

CO2, SpO2, NIBP, and IP

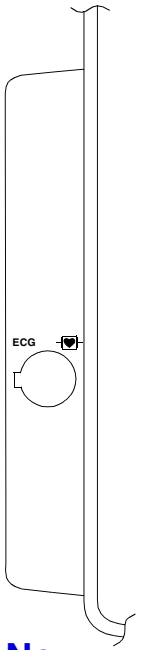
577

Parts List Configurator

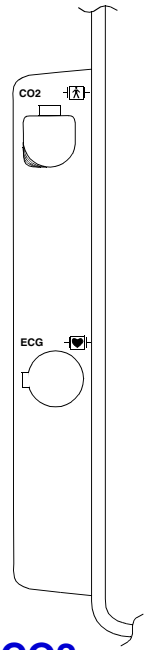
With Pacer, 3-Lead

Choose the appropriate bezel.

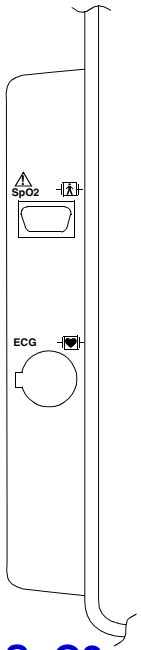
Go to Bezel Label Parts List



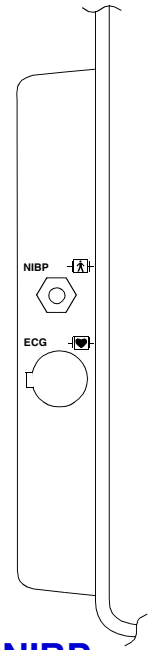
No other Options



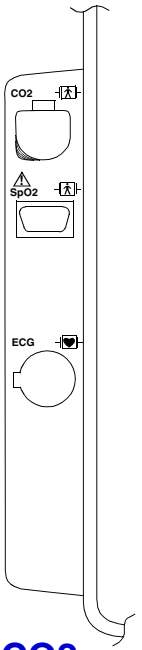
CO2



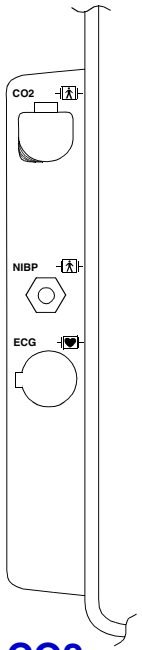
SpO2



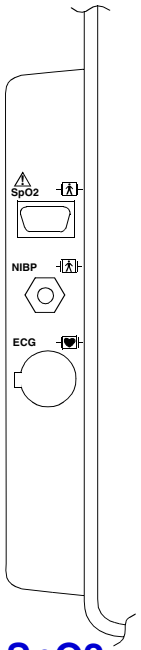
NIBP



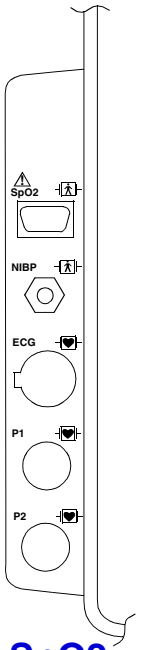
CO2 and SpO2



CO2 and NIBP



SpO2 and NIBP



SpO2, NIBP, and IP

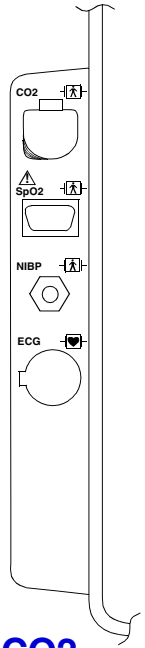
578

Parts List Configurator

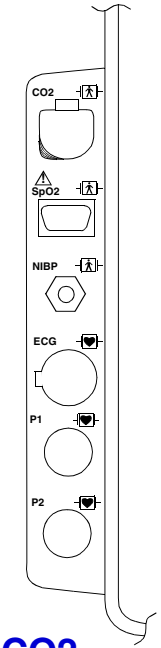
With Pacer, 3-Lead (continued)

Choose the appropriate bezel.

Go to Bezel Label Parts List



CO2, SpO2, and NIBP



CO2, SpO2, NIBP, and IP

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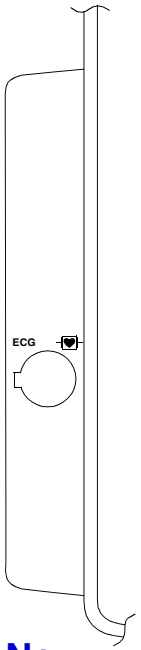
Parts List Configurator

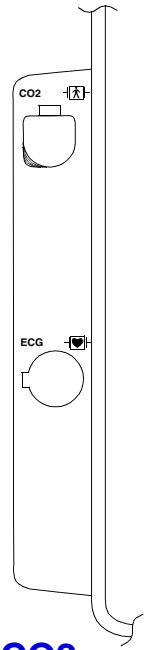
With Pacer, 12-Lead

Choose the appropriate bezel.

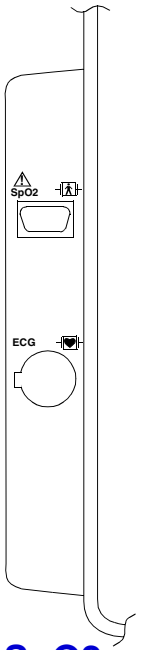
Go to Bezel Label Parts List



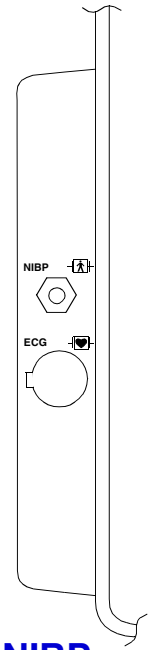
No other Options



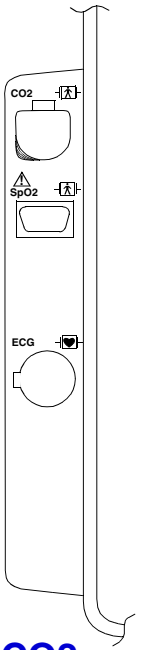
CO2



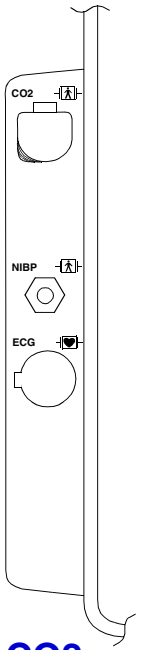
SpO2



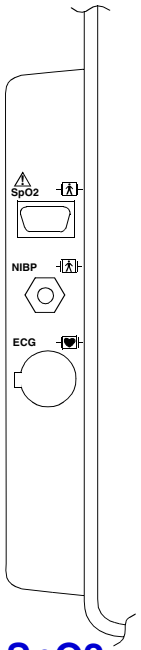
NIBP



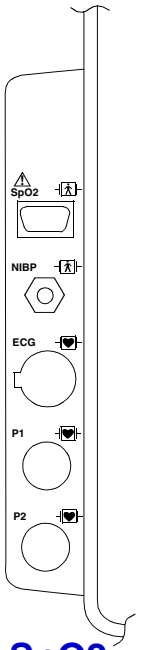
CO2 and SpO2



CO2 and NIBP



SpO2 and NIBP



SpO2, NIBP, and IP

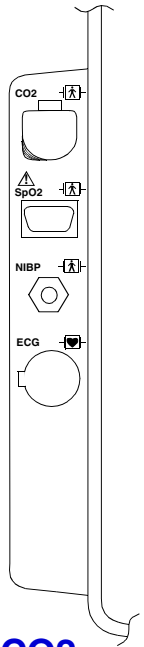
580

Parts List Configurator

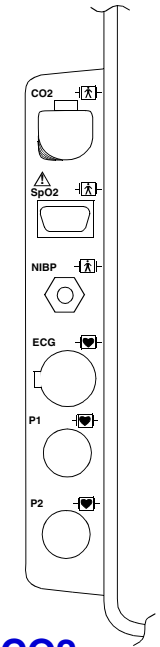
With Pacer, 12-Lead (continued)

Choose the appropriate bezel.

Go to Bezel Label Parts List



CO2, SpO2, and NIBP



CO2, SpO2, NIBP, and IP

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No Pacer, 3-Lead, No Options

The specific parts for your device are listed in the following table.

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-98	Large Keypad (Advisory) English	Select other language
A10	1	3006190-134	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-00	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language

No Pacer, 3-Lead, No Options

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
170	1	3009064-12	Operator Instruct Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, No Options

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-97	Large Keypad (Advisory) English	Select other language
A10	1	3006190-133	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-00	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language

Pacer, 3-Lead, No Options

External Parts

Item	Quantity	Part Number	Part Description	Note
178	1	3009790-00	50 mm Printer Screw Cover Label	**100 mm Printer** is optional
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	**Select other language**

No Pacer, 3-Lead, EtCO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly
226	1	3010805-000	10-pin Retainer Clip	CO2 Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly

No Pacer, 3-Lead, EtCO2

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

No Pacer, 3-Lead, EtCO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-98	Large Keypad (Advisory) English	Select other language
A10	1	3006190-134	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-55	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, EtCO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	
A23	1	3012140-004	CO2 PCB Assembly	
W26	1	3012181-02	CO2/OEM PCB Cable	
W30	1	3012397-01	CO2 Adapter Cable	
20	1	3012122-01	Lower Support Foam	
22	1	3012123-01	Upper Support Foam	
144	1	3009558-01	Option Shield	
196	1	804447-21	Foam Spacer	
216	2	201508-000	Lock Nut, 4-40	
226	1	3010805-000	10-pin Retainer Clip	
354	1	3012119-02	CO2 Connector Adapter	

Pacer, 3-Lead, EtCO2

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
358	1	3012121-01	CO2 Connector Retainer	
360	1	3007997-01	CO2 Connector Seal	
370	1	3012125-01	Ground Strap	
376	4	202253-730	Nylock Screw, 2-56 × .375 L	
384	1	3012421-01	OEM PCB Shield	
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

Pacer, 3-Lead, EtCO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-97	Large Keypad (Advisory) English	Select other language
A10	1	3006190-133	Large Keypad (Manual) English	Select other language
A12	1	3006115-001	100 mm Printer [see Mfg Note]	
158	1	3006241-55	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 3-Lead, SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
226	1	3010805-000	10-pin Retainer Clip	SpO2 Assembly
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
376	2	202253-730	Nylock Screw, 2-56 × .375 L	SpO2 Assembly. W22 into Bezel
384	1	3012421-01	OEM PCB Shield	OEM Option

No Pacer, 3-Lead, SpO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-98	Large Keypad (Advisory) English	Select other language
A10	1	3006190-134	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-01	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly

No Pacer, 3-Lead, SpO2

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
20	1	3012122-01	Lower Support Foam	
22	1	3012123-01	Upper Support Foam	
144	1	3009558-01	Option Shield	
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
226	1	3010805-000	10-pin Retainer Clip	SpO2 Assembly
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
384	1	3012421-01	OEM PCB Shield	

Pacer, 3-Lead, SpO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-97	Large Keypad (Advisory) English	Select other language
A10	1	3006190-133	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-01	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
288	1	3011526-00	Oximeter Patent Label	

Pacer, 3-Lead, SpO2

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 3-Lead, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A21	1	3008943-000	NIBP Module	NIBP Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	1	3010805-000	10-pin Retainer Clip	NIBP Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly

No Pacer, 3-Lead, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly

No Pacer, 3-Lead, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
384	1	3012421-01	OEM PCB Shield	OEM Option
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-35	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14

No Pacer, 3-Lead, NIBP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A21	1	3008943-000	NIBP Module	NIBP Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	1	3010805-000	10-pin Retainer Clip	NIBP Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly

Pacer, 3-Lead, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option
A09	1	3006189-01	Small Keypad – English	**Select other language**
A10	1	3006190-96	Large Keypad (Advisory) English	**Select other language**
A10	1	3006190-132	Large Keypad (Manual) English	**Select other language**
A12	1	804189-02	50 mm Printer [see **Mfg Date Note**]	**100 mm Printer** is optional
10	1	3006115-01	50 mm Printer Cover	**100 mm Printer** is optional
158	1	3006241-35	Parameter Bezel Label – English	**Select other language**
162	1	3009058-00	Product ID Label (Edmark) English	**Select other language**
162	1	3009058-12	Product ID Label (Biphasic) English	**Select other language**
164	1	3009059-00	Explosion/Hazard Label – English	**Select other language**
170	1	3009064-06	Operator Instruct. Label (Advisory) English	**Select other language**
170	1	3009064-30	Operator Instruct. Label (Manual) English	**Select other language**

Pacer, 3-Lead, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
178	1	3009790-00	50 mm Printer Screw Cover Label	**100 mm Printer** is optional
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	**Select other language**

No Pacer, 3-Lead, EtCO2, SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly

No Pacer, 3-Lead, EtCO2, SpO2

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
226	2	3010805-000	10-pin Retainer Clip	CO2 and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

No Pacer, 3-Lead, EtCO2, SpO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-98	Large Keypad (Advisory) English	Select other language
A10	1	3006190-134	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-45	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly

No Pacer, 3-Lead, EtCO2, SpO2

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, EtCO2, SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly

Pacer, 3-Lead, EtCO2, SpO2

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
226	2	3010805-000	10-pin Retainer Clip	CO2 and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

Pacer, 3-Lead, EtCO2, SpO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-97	Large Keypad (Advisory) English	Select other language
A10	1	3006190-133	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-45	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
288	1	3011526-00	Oximeter Patent Label	CO2 Assembly

Pacer, 3-Lead, EtCO2, SpO2

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 3-Lead, EtCO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	2	3010805-000	10-pin Retainer Clip	CO2 and NIBP Assemblies

No Pacer, 3-Lead, EtCO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

No Pacer, 3-Lead, EtCO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-51	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional

No Pacer, 3-Lead, EtCO2, NIBP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, EtCO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	2	3010805-000	10-pin Retainer Clip	CO2 and NIBP Assemblies

Pacer, 3-Lead, EtCO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

Pacer, 3-Lead, EtCO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-51	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional

Pacer, 3-Lead, EtCO2, NIBP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 3-Lead, SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	2	3010805-000	10-pin Retainer Clip	NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly

No Pacer, 3-Lead, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option

No Pacer, 3-Lead, SpO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-017	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (In Battery Well 1)
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

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Pacer, 3-Lead, SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	2	3010805-000	10-pin Retainer Clip	NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly

Pacer, 3-Lead, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option

Pacer, 3-Lead, SpO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-17	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language

Pacer, 3-Lead, SpO2, NIBP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
178	1	3009790-00	50 mm Printer Screw Cover Label	**100 mm Printer** is optional
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (In Battery Well 1)
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	**Select other language**

No Pacer, 3-Lead, SpO2, NIBP, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	2	3010805-000	10-pin Retainer Clip	NIBP and SpO2 Assemblies

No Pacer, 3-Lead, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly

No Pacer, 3-Lead, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-57	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (In Battery Well 1)

No Pacer, 3-Lead, SpO2, NIBP, IP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, SpO2, NIBP, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W33	1	3200466-01	Invasive Pressure 1&2 Wire Harness	IP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	2	3010805-000	10-pin Retainer Clip	NIBP and SpO2 Assemblies

Pacer, 3-Lead, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly

Pacer, 3-Lead, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-57	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional

Pacer, 3-Lead, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (In Battery Well 1)
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 3-Lead, EtCO2, SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly

No Pacer, 3-Lead, EtCO2, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly

No Pacer, 3-Lead, EtCO2, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

No Pacer, 3-Lead, EtCO2, SpO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-47	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional

No Pacer, 3-Lead, EtCO2, SpO2, NIBP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, EtCO2, SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly

Pacer, 3-Lead, EtCO2, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly

Pacer, 3-Lead, EtCO2, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

Pacer, 3-Lead, EtCO2, SpO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-47	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional

Pacer, 3-Lead, EtCO2, SpO2, NIBP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly

No Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly

No Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly
406	1	3007998-00	Invasive Pressure Gasket	IP Assembly

No Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-40	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional

No Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly

Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
196	1	804447-21	Foam Spacer	CO2 Assembly
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly

Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly

Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	100 mm Printer is optional
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional
158	1	3006241-40	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional

Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP

External Parts (continued)

Item	Quantity	Part Number	Part Description	Note
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, No Options

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, No Options

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-98	Large Keypad (Advisory) English	Select other language
A10	1	3006190-134	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	50 mm Printer is optional
158	1	3006241-00	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14

Pacer, 12-Lead, No Options

The specific parts for your device are listed in the following table.

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-97	Large Keypad (Advisory) English	Select other language
A10	1	3006190-133	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-00	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, EtCO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly
226	1	3010805-000	10-pin Retainer Clip	CO2 Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly

No Pacer, 12-Lead, EtCO2

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

No Pacer, 12-Lead, EtCO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-98	Large Keypad (Advisory) English	Select other language
A10	1	3006190-134	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-55	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 12-Lead, EtCO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	
22	1	3012123-01	Upper Support Foam	
144	1	3009558-01	Option Shield	
196	1	804447-21	Foam Spacer	CO2 Assembly
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly
226	1	3010805-000	10-pin Retainer Clip	CO2 Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly

Pacer, 12-Lead, EtCO2

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
384	1	3012421-01	OEM PCB Shield	
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

Pacer, 12-Lead, EtCO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-97	Large Keypad (Advisory) English	Select other language
A10	1	3006190-133	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-55	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
226	1	3010805-000	10-pin Retainer Clip	SpO2 Assembly
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option

No Pacer, 12-Lead, SpO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-98	Large Keypad (Advisory) English	Select other language
A10	1	3006190-134	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-01	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 12-Lead, SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
20	1	3012122-01	Lower Support Foam	
22	1	3012123-01	Upper Support Foam	
144	1	3009558-01	Option Shield	
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
226	1	3010805-000	10-pin Retainer Clip	SpO2 Assembly
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
384	1	3012421-01	OEM PCB Shield	

Pacer, 12-Lead, SpO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-97	Large Keypad (Advisory) English	Select other language
A10	1	3006190-133	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-01	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A21	1	3008943-000	NIBP Module	NIBP Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	1	3010805-000	10-pin Retainer Clip	NIBP Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option

No Pacer, 12-Lead, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-35	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 12-Lead, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A21	1	3008943-000	NIBP Module	NIBP Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	1	3010805-000	10-pin Retainer Clip	NIBP Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option

Pacer, 12-Lead, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-35	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, EtCO2, SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly

No Pacer, 12-Lead, EtCO2, SpO2

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
226	2	3010805-000	10-pin Retainer Clip	CO2 and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

No Pacer, 12-Lead, EtCO2, SpO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-98	Large Keypad (Advisory) English	Select other language
A10	1	3006190-134	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-45	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 12-Lead, EtCO2, SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut,4-40	CO2 Assembly

Pacer, 12-Lead, EtCO2, SpO2

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
226	2	3010805-000	10-pin Retainer Clip	CO2 and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

Pacer, 12-Lead, EtCO2, SpO2

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-97	Large Keypad (Advisory) English	Select other language
A10	1	3006190-133	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-45	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	CO2 Assembly
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, EtCO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	2	3010805-000	10-pin Retainer Clip	CO2 and NIBP Assemblies

No Pacer, 12-Lead, EtCO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

No Pacer, 12-Lead, EtCO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-51	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 12-Lead, EtCO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly
216	4	201508-000	Lock Nut,4-40	CO2 and NIBP Assemblies
226	2	3010805-000	10-pin Retainer Clip	CO2 and NIBP Assemblies

Pacer, 12-Lead, EtCO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

Pacer, 12-Lead, EtCO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-51	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	2	3010805-000	10-pin Retainer Clip	SpO2 and NIBP Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly

No Pacer, 12-Lead, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option

No Pacer, 12-Lead, SpO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-17	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (In Battery Well 1)
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

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Pacer, 12-Lead, SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	2	3010805-000	10-pin Retainer Clip	NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly

Pacer, 12-Lead, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option

Pacer, 12-Lead, SpO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-17	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (In Battery Well 1)
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, SpO2, NIBP, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	2	3010805-000	10-pin Retainer Clip	SpO2 and NIBP Assemblies

No Pacer, 12-Lead, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly

No Pacer, 12-Lead, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-57	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (In Battery Well 1)
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

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Pacer, 12-Lead, SpO2, NIBP, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Option
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly
20	1	3012122-01	Lower Support Foam	OEM Option
22	1	3012123-01	Upper Support Foam	OEM Option
144	1	3009558-01	Option Shield	OEM Option
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly
226	2	3010805-000	10-pin Retainer Clip	SpO2 and NIBP Assemblies

Pacer, 12-Lead, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Option
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly

Pacer, 12-Lead, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-17	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (In Battery Well 1)
342	1	3012178-01	CO2 Exhaust Cover Label	Ref: PN 3006112-14
386	1	3012453-00	Label Spacer	Ref: PN 3006112-14
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, EtCO2, SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly

No Pacer, 12-Lead, EtCO2, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly

No Pacer, 12-Lead, EtCO2, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

No Pacer, 12-Lead, EtCO2, SpO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-47	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 12-Lead, EtCO2, SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W28	1	3012140-001	CO2 Connector	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly
196	1	804447-21	Foam Spacer	CO2 Assembly

Pacer, 12-Lead, EtCO2, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies

Pacer, 12-Lead, EtCO2, SpO2, NIBP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly

Pacer, 12-Lead, EtCO2, SpO2, NIBP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-47	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

No Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
W33	1	3200466-01	Invasive Pressure Wire Harness	IP Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly

No Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
196	1	804447-21	Foam Spacer	CO2 Assembly
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly

No Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly

No Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-168	Large Keypad (Advisory) English	Select other language
A10	1	3006190-180	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-40	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Quantity	Part Number	Part Description	Note
A06	1	3008541-08	OEM PCB Assembly	OEM Assembly
A16	1	3008538-000	SpO2 Module	Ref: PN LP12VANILLA
A21	1	3008943-000	NIBP Module	NIBP Assembly
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly
W22	1	3007993-02	SpO2 Cable Assembly	SpO2 Assembly
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly
W28	1	3012140-001	CO2 Connector	CO2 Assembly
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly
20	1	3012122-01	Lower Support Foam	OEM Assembly
22	1	3012123-01	Upper Support Foam	OEM Assembly
144	1	3009558-01	Option Shield	OEM Assembly

Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
196	1	804447-21	Foam Spacer	CO2 Assembly
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies
228	1	3010805-001	14-pin Retainer Clip	SpO2 Assembly
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly
346	1	3012128-000	NIBP Air Connector	NIBP Assembly
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly

Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP

Internal Parts (continued)

Item	Quantity	Part Number	Part Description	Note
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly
370	1	3012125-01	Ground Strap	CO2 Assembly
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 and SpO2 Assemblies
378	1	3012180-02	Tubing	NIBP Assembly
380	1	3012333-001	Inline Fitting	NIBP Assembly
384	1	3012421-01	OEM PCB Shield	OEM Assembly
388	1	3012500-000	Tube Routing Clip	CO2 Assembly
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly

Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP

External Parts

Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	Select other language
A10	1	3006190-96	Large Keypad (Advisory) English	Select other language
A10	1	3006190-132	Large Keypad (Manual) English	Select other language
A12	1	3006229-02	100 mm Printer	
158	1	3006241-40	Parameter Bezel Label – English	Select other language
162	1	3009058-00	Product ID Label (Edmark) English	Select other language
162	1	3009058-12	Product ID Label (Biphasic) English	Select other language
164	1	3009059-00	Explosion/Hazard Label – English	Select other language
170	1	3009064-06	Operator Instruct. Label (Advisory) English	Select other language
170	1	3009064-30	Operator Instruct. Label (Manual) English	Select other language
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly
Ref.	1	3011371-051	Font/Voice System Software – English	Select other language

Front Case Parts

Common Front Case Parts

Item	Quantity	Part Number	Part Description	Note
A05	1	3010524-04	Interface PCB	
W04	1	3009677-01	System PCB/Interface PCB Cable	
W11	1	3006216-03	Therapy Connector Cable	
W15	1	3011128-01	Selector Assembly (with nut and washer)	
W12	1	3009726-04	Small Keypad/Interface PCB Cable	
W13	1	3009677-03	Large Keypad/Interface PCB Cable	
W16	1	3009724-00	Printer Assembly/Interface PCB Cable	
W17	1	3009726-03	Speaker Assembly	
W19	1	3009726-01	Printer Assembly/Chassis Ground Cable	
8	1	3006187-00	W15 Selector Assembly Knob	
36	1	3009412-00	Front Panel Plug	
172	1	3009065-01	Medtronic Physio-Control Icon Label	
232	3	201407-069	Nylock Screw, 6-32 x .375 L	
238	1	200060-017	Therapy Connector Cable O-ring Seal	

Front Case Parts

EL Display Devices Only

The parts in the **Front Case Common Parts** list are common to all devices regardless of the options or language.

Item	Quantity	Part Number	Part Description	Note
A11	1	3012695-000	EL Display Assembly	
2	1	3006113-06	Front Case	
42	1	3012696-01	EL Display Bracket	
50	1	3006810-01	Printer Assembly Connector Bracket	
190	1	3006245-00	Speaker Assembly Felt	
204	1	3006809-00	Printer Connector Gasket	
212	1	3006186-05	EL Display Lens	
218	1	200040-001	Therapy Connector Cable Snap Ring	
230	15	202253-761	Nylock Screw, 4-40 x .312 L	
242	1	804234-03	Case Perimeter Seal	
246	1	3012693-00	Speaker Assembly Hold-Down Spring	
336	4	200804-102	Washer	
338	1	252-0045-00	Translucent Adhesive	
396	4	804447-17	Pad	

Front Case Parts

LCD Devices Only

The parts in the **Front Case Common Parts** list are common to all devices regardless of the options or language.

Item	Quantity	Part Number	Part Description	Note
A08	1	3006806-00	Backlight PCB	
A11	1	3010612-00	LCD Assembly	
W06	1	3009702-00	Interface PCB/Backlight PCB Cable	
W18	1	3009701-00	LCD Assembly/Interface PCB Cable	
2	1	3006113-05	Front Case	
6	4	3006183-02	Display Shock Mount	
42	1	3006184-02	LCD Assembly Bracket	
50	1	3006810-01	Printer Assembly Connector Bracket	
142	1	3009482-00	LCD Assembly Adhesive Shield	
154	1	800943-09	International High Voltage Label	
182	1	3009483-01	LCD Assembly Adhesive	
188	1	201457-001	Adhesive Cable Tie Mount	
190	1	3006245-00	Speaker Assembly Felt	

Front Case Parts

LCD Devices Only

Item	Quantity	Part Number	Part Description	Note
204	1	3006809-00	Printer Connector Gasket	
212	1	3006186-04	LCD Lens	
218	1	200040-001	Therapy Connector Cable Snap Ring	
222	2	200536-001	Self-locking Cable Tie .10 W × 4.0 L	
230	12	202253-761	Nylock Screw, 4-40 × .312 L	
242	1	804234-03	Case Perimeter Seal	
246	1	3012693-00	Speaker Assembly Hold-Down Spring	
264	1	805613-00	ESD Shield Adhesive	
280	1	201501-017	Adhesive Tape .75 W × .045 T	
318	1	3011690-00	LP12 Display Label	
338	1	252-0045-00	Translucent Adhesive	

System/Memory/Therapy PCB Assembly Parts

The parts in the System/Memory/Therapy PCB Assembly (PN 3006112-06 or 3006112-09) are common to devices as noted regardless of options or language.

Item	Quantity	Part Number	Part Description	Note
A01	1	3006227-08	System PCB	
A02	1	3008520-07	Memory PCB	replaces PN 3008520-04
A04	1	3006235-09	Therapy PCB—Edmark Devices	
A04	1	3006235-08	Therapy PCB—Biphasic Devices	
W03	1	3009878-002	System PCB/Therapy PCB Cable	
12	1	3009347-03	System PCB CPU Shield	
54	1	3009331-00	Therapy PCB, EMI Shield	
56	1	3009345-00	System PCB, ECG Front, EMI Shield	
58	1	3009346-00	System PCB, ECG Back Shield	
146	1	3009642-02	System PCB/Therapy PCB Shield	
196	1	804447-21	Foam Spacer	Used on Item 56
198	1	3010551-001	Reverse Bend Clip-On Contact	
216	10	201508-000	Carbon Steel Lock Nut, 4-40 Thread	
230	9	202253-761	Nylock Screw, 4-40 x .312 L	

System/Memory/Therapy PCB Assembly Parts

Item	Quantity	Part Number	Part Description	Note
251	9	200266-006	Hex Standoff, 4-40 × .250 W × .375 L	
290	1	804447-34	Adhesive Part, 1.0 W × 3.5 H × .250 T	Used on Item 12; LCD only
292	2	3011630-00	PCB Spacer	
294	1	3011629-00	Hex Insert	
296	1	202253-550	Nylock Screw, 4-40 × 1.125 L	
326	1	3011980-00	Shock Hazard Label	Biphasic Assembly
BT01	1	202305-000	Coin Battery (type CR2032)	Used on Item A01

Rear Case Common Parts—Edmark Devices Only

The parts in the Rear Case Common Parts—Edmark list (part of PN 3006112-COM1) are common to all Edmark devices regardless of options or language.

Item	Quantity	Part Number	Part Description	Note
A03	1	3006237-06	Power PCB	See Ref. for F1, F2, F4
A07	1	3006394-02	Contact PCB	
A13	1	3006219-01	Transfer Relay Assembly	Ref. PN LP12VANILLA
A14	1	3006221-01	Waveshaping Inductor	Ref. PN LP12VANILLA
A15	1	3006220-01	Energy Storage Capacitor	Ref. PN LP12VANILLA
A17	1	3008897-01	Interconnect Bracket	
W01	1	3009677-05	Power PCB/System PCB Cable	
W02	1	3009726-05	A03 Power PCB/A04 Therapy PCB Cable	
W05	1	3009678-03	A03 Power PCB/A07 Contact PCB Cable	
W07	1	3007991-02	ECG Connector Cable	
W08	1	3009652-01	System Connector Cable	
W09	1	3008392-00	Auxiliary Connector Cable	
W10	1	3009726-08	Battery Pins/A03 Power PCB Cable	
W14	1	3009276-02	A01 System PCB/PC Card Slot Cable	

Rear Case Common Parts—Edmark Devices Only

Item	Quantity	Part Number	Part Description	Note
4	1	3006114-05	Rear Case	
16	1	3006291-00	Drain Seal	
18	2	3006824-01	Gurney Hook	
24	1	3006375-02	Battery Retainer	
26	1	3006240-00	Blank Door	
26	1	3011422-00	Modem Door	If modem is installed
28	2	3006766-02	Paddle Cover Latch Assembly	
32	1	3010593-00	High Voltage Shield	
34	1	3006239-04	Parameter Bezel	
44	2	3006374-00	Battery Latch	
46	1	3006379-01	Relay Bracket	
48	1	3006808-00	Modem Bracket	
52	1	3007005-02	A14 Waveshaping Inductor Bracket	Ref: PN 3006112-08
60	1	3012535-01	Capacitor Bracket	
62	1	3010520-02	A03 Power PCB Bracket	
148	1	3009787-01	A15 Energy Storage Capacitor Shield	

Rear Case Common Parts—Edmark Devices Only

Item	Quantity	Part Number	Part Description	Note
150	1	3010591-04	Rear Case EMI Shield	
152	1	805542-00	Energy Storage Capacitor End Shield	
154	1	800943-09	International High Voltage Label	
156	1	804194-00	Energy Storage Capacitor Mount Cover	
160	1	3009057-00	Serial Number Label	
166	1	3009060-00	FDA Label	
168	1	3009061-00	W09 Auxiliary Connector Cable Label	
174	1	3009789-00	Left Latch Cover Label	
176	1	3009789-01	Right Latch Cover Label	
186	4	802278-02	Battery Pin	Ref: PN LP12GENERIC
192	1	804447-20	Adhesive Part, 3.0 W × 2.0 H × 0.1 T	Used on Item A15
202	4	802885-00	Mounting Foot	
208	4	804206-01	Battery Grommet	
214	2	806091-00	Stainless Steel Connector Nut	
216	4	201508-000	Carbon Steel Lock Nut, 4-40 Thread	
220	2	805487-00	Rear Connector Seal Plate	

Rear Case Common Parts—Edmark Devices Only

Item	Quantity	Part Number	Part Description	Note
222	7	200536-001	Self-locking Cable Tie .10 W × 4.0 L	
224	1	200536-011	Self-locking Cable Tie .35 W × 21.0 L	
230	23	202253-761	Nylock Screw, 4-40 × .312 L	
232	30	201407-069	Nylock Screw, 6-32 × .375 L	
234	4	202253-729	Nylock Screw, 2-56 × .312 L	
236	1	805915-01	W07 ECG Connector Cable Gasket	
240	2	200060-011	System and Aux Connector O-ring Seals	
248	1	3010569-02	Nylon Hex Standoff	
336	5	200804-102	Flat Washer .312 od × .125 id	
264	2	805613-00	ESD Shield Adhesive	
266	1	202289-001	Cellulose Sponge, 3.0 W × 1.0 H	
268	2	202271-001	Snap	
303	1	804447-33	Adhesive Part, 1.0 W × 3.0 H × .125 T	Used on Item A14
308	3	202253-570	Nylock Screw, 6-32 × .375 L	

Rear Case Common Parts—Edmark Devices Only

Item	Quantity	Part Number	Part Description	Note
340	1	3012209-00	CO2 Exhaust Seal	
Ref	3	3010749-006	Fuse, 15A, 32V (F1, F2, F4)	Replaceable; A03 Power PCB

Rear Case Common Parts—Biphasic Devices Only

The parts in the Rear Case Common Parts—Biphasic list (part of 3006112-COM1) are common to all Biphasic devices regardless of options or language.

Item	Quantity	Part Number	Part Description	Note
A03	1	3006237-06	Power PCB	See Ref. for F1, F2, F4
A07	1	3006394-02	Contact PCB	
A13	1	3006219-01	Transfer Relay Assembly	Ref. PN LP12VANILLA
A14	1	3010212-02	Inductive Resistor	Ref. PN LP12VANILLA
A15	1	3008164-001	Energy Storage Capacitor	Ref. PN LP12VANILLA
A17	1	3008897-01	Interconnect Bracket	
A22	1	3010178-009	Biphasic PCB	Ref. PN LP12VANILLA
W01	1	3009677-05	Power PCB/System PCB Cable	
W02	1	3009726-05	A03 Power PCB/A04 Therapy PCB Cable	
W05	1	3009678-03	A03 Power PCB/A07 Contact PCB Cable	
W07	1	3007991-02	ECG Connector Cable	
W08	1	3009652-01	System Connector Cable	
W09	1	3008392-00	Auxiliary Connector Cable	
W10	1	3009726-08	Battery Pins/A03 Power PCB Cable	

Rear Case Common Parts—Biphasic Devices Only

Item	Quantity	Part Number	Part Description	Note
W14	1	3009276-02	A01 System PCB/PC Card Slot Cable	
4	1	3006114-05	Rear Case	
16	1	3006291-00	Drain Seal	
18	2	3006824-01	Gurney Hook	
24	1	3006375-02	Battery Retainer	
26	1	3006240-00	Blank Door	
26	1	3011422-00	Modem Door	If modem is installed
28	2	3006766-02	Paddle Cover Latch Assembly	
32	1	3010593-00	High Voltage Shield	
34	1	3006239-04	Parameter Bezel	
44	2	3006374-00	Battery Latch	
46	1	3006379-01	Relay Bracket	
48	1	3006808-00	Modem Bracket	
60	1	3012535-01	Capacitor Bracket	
62	1	3010520-02	A03 Power PCB Bracket	
148	1	3009787-01	Energy Storage Capacitor Shield	

Rear Case Common Parts—Biphasic Devices Only

Item	Quantity	Part Number	Part Description	Note
150	1	3010591-04	Rear Case EMI Shield	
152	1	805542-00	Energy Storage Capacitor End Shield	
154	1	800943-09	International High Voltage Label	
156	1	804194-00	Energy Storage Capacitor Mount Cover	
160	1	3009057-00	Serial Number Label	
166	1	3009060-00	FDA Label	
168	1	3009061-00	W09 Auxiliary Connector Cable Label	
174	1	3009789-00	Left Latch Cover Label	
176	1	3009789-01	Right Latch Cover Label	
186	4	802278-02	Battery Pin	Ref: PN LP12GENERIC
192	1	804447-20	Adhesive Part, 3.0 W × 2.0 H × 0.1 T	Used on Item A15
202	4	802885-00	Mounting Foot	
208	4	804206-01	Battery Grommet	
214	2	806091-00	Stainless Steel Connector Nut	
216	4	201508-000	Carbon Steel Lock Nut, 4-40 Thread	
220	2	805487-00	Rear Connector Seal Plate	

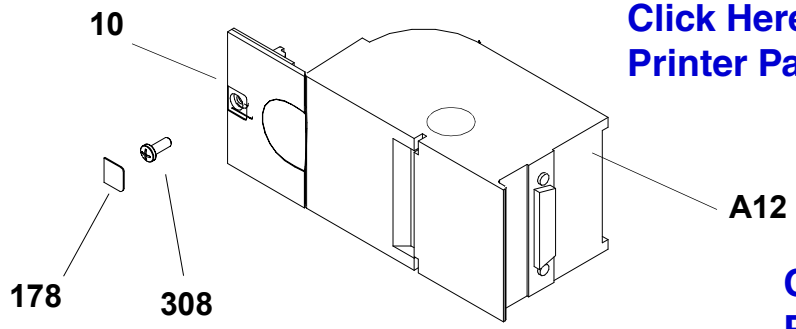
Rear Case Common Parts—Biphasic Devices Only

Item	Quantity	Part Number	Part Description	Note
222	7	200536-001	Self-locking Cable Tie .10 W × 4.0 L	
224	1	200536-011	Self-locking Cable Tie .35 W × 21.0 L	
230	24	202253-761	Nylock Screw, 4-40 × .312 L	
232	30	201407-069	Nylock Screw, 6-32 × .375 L	
234	4	202253-729	Nylock Screw, 2-56 × .312 L	
236	1	805915-01	W07 ECG Connector Cable Gasket	
240	2	200060-011	System and Aux Connector O-ring Seals	
248	1	3010569-02	Nylon Hex Standoff	
336	5	200804-102	Flat Washer .312 OD × .125 ID	
264	2	805613-00	ESD Shield Adhesive	
266	1	202289-001	Cellulose Sponge, 3.0 W × 1.0 H	
268	2	202271-001	Snap	
308	3	202253-570	Nylock Screw, 6-32 × .375 L	

Rear Case Common Parts—Biphasic Devices Only

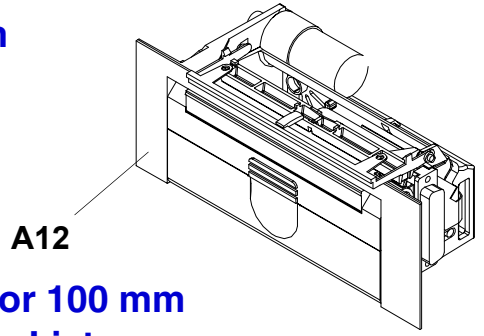
Item	Quantity	Part Number	Part Description	Note
324	1	3011589-03	Biphasic PCB Mounting Bracket	Biphasic Assembly
328	1	3011979-00	Wire Harness	Biphasic Assembly
330	1	3011979-01	Wire Harness	Biphasic Assembly
332	1	3011979-02	Wire Harness	Biphasic Assembly
336	1	200804-102	Flat Washer .312 OD x .125 ID	Biphasic Assembly
340	1	3012209-00	CO2 Exhaust Seal	
374	1	3012345-00	Ground Strap	Biphasic Assembly
Ref	3	3010749-006	Fuse, 15A, 32V (F1, F2, F4)	Replaceable; **A03 Power PCB**

A12 Printers



50 mm Printer

Click Here for 50 mm Printer Parts List

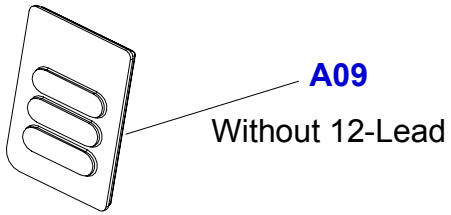


Click Here for 100 mm Printer Parts List

100 mm Printer

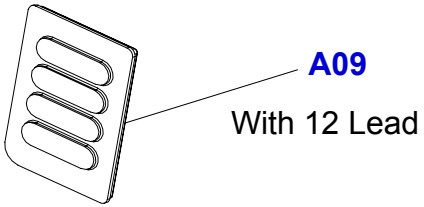
Item	Quantity	Part Number	Part Description	Note
A12	1	3011714-00	50 mm Printer (w/ Front Case PN 3006113-02)	Mfg Date < 1 May 98
A12	1	804189-02	50 mm Printer (w/ Front Case PN 3006113-03)	Mfg Date ≥ 1 May 98
A12	1	3006229-02	100 mm Printer	
10	1	3006115-01	50 mm Printer Cover	
178	1	3009790-00	50 mm Printer Screw Cover	
308	1	202253-570	Nylock Screw, 6-32 x .375 L	

A09 Small Keypad Language



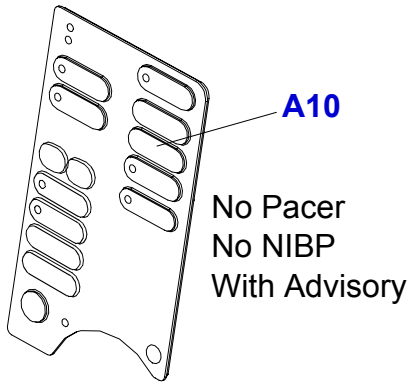
Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-01	Small Keypad – English	Without 12-Lead key
A09	1	3006189-03	Small Keypad – German	Without 12-Lead key
A09	1	3006189-05	Small Keypad – French	Without 12-Lead key
A09	1	3006189-07	Small Keypad – Spanish	Without 12-Lead key
A09	1	3006189-09	Small Keypad – Italian	Without 12-Lead key
A09	1	3006189-11	Small Keypad – Swedish	Without 12-Lead key
A09	1	3006189-13	Small Keypad – Danish	Without 12-Lead key
A09	1	3006189-15	Small Keypad – Portuguese	Without 12-Lead key
A09	1	3006189-17	Small Keypad – Norwegian	Without 12-Lead key
A09	1	3006189-19	Small Keypad – Dutch	Without 12-Lead key
A09	1	3006189-21	Small Keypad – Polish	Without 12-Lead key
A09	1	3006189-23	Small Keypad – Finnish	Without 12-Lead key

A09 Small Keypad Language



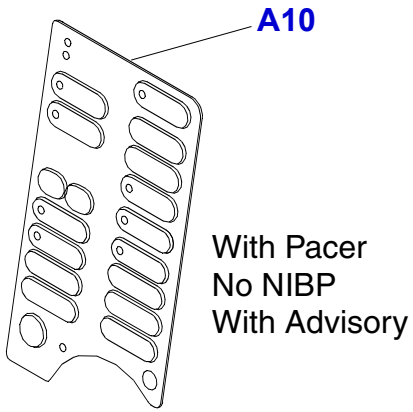
Item	Quantity	Part Number	Part Description	Note
A09	1	3006189-00	Small Keypad – English	With 12-Lead key
A09	1	3006189-02	Small Keypad – German	With 12-Lead key
A09	1	3006189-04	Small Keypad – French	With 12-Lead key
A09	1	3006189-06	Small Keypad – Spanish	With 12-Lead key
A09	1	3006189-08	Small Keypad – Italian	With 12-Lead key
A09	1	3006189-10	Small Keypad – Swedish	With 12-Lead key
A09	1	3006189-12	Small Keypad – Danish	With 12-Lead key
A09	1	3006189-14	Small Keypad – Portuguese	With 12-Lead key
A09	1	3006189-16	Small Keypad – Norwegian	With 12-Lead key
A09	1	3006189-18	Small Keypad – Dutch	With 12-Lead key
A09	1	3006189-20	Small Keypad – Polish	With 12-Lead key
A09	1	3006189-22	Small Keypad – Finnish	With 12-Lead key

A10 Large Keypad Language



Item	Quantity	Part Number	Part Description
A10	1	3006190-98	A10 Large Keypad – English
A10	1	3006190-101	A10 Large Keypad – German
A10	1	3006190-104	A10 Large Keypad – French
A10	1	3006190-107	A10 Large Keypad – Spanish
A10	1	3006190-110	A10 Large Keypad – Italian
A10	1	3006190-113	A10 Large Keypad – Swedish
A10	1	3006190-116	A10 Large Keypad – Danish
A10	1	3006190-119	A10 Large Keypad – Portuguese
A10	1	3006190-122	A10 Large Keypad – Norwegian
A10	1	3006190-125	A10 Large Keypad – Dutch
A10	1	3006190-128	A10 Large Keypad – Polish
A10	1	3006190-131	A10 Large Keypad – Finnish

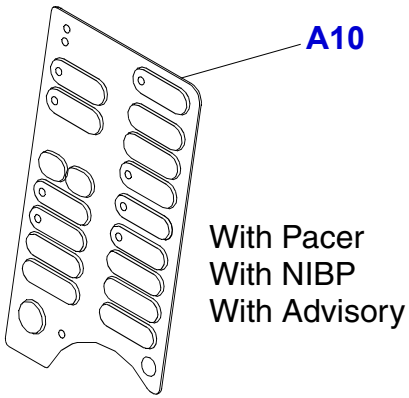
A10 Large Keypad Language



With Pacer
No NIBP
With Advisory

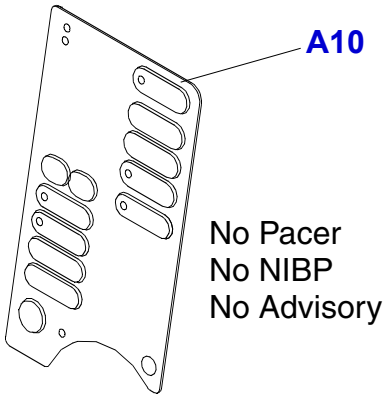
Item	Quantity	Part Number	Part Description
A10	1	3006190-97	A10 Large Keypad – English
A10	1	3006190-100	A10 Large Keypad – German
A10	1	3006190-103	A10 Large Keypad – French
A10	1	3006190-106	A10 Large Keypad – Spanish
A10	1	3006190-109	A10 Large Keypad – Italian
A10	1	3006190-112	A10 Large Keypad – Swedish
A10	1	3006190-115	A10 Large Keypad – Danish
A10	1	3006190-118	A10 Large Keypad – Portuguese
A10	1	3006190-121	A10 Large Keypad – Norwegian
A10	1	3006190-124	A10 Large Keypad – Dutch
A10	1	3006190-127	A10 Large Keypad – Polish
A10	1	3006190-130	A10 Large Keypad – Finnish

A10 Large Keypad Language



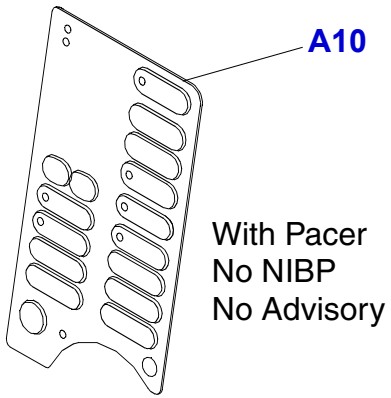
Item	Quantity	Part Number	Part Description
A10	1	3006190-96	A10 Large Keypad – English
A10	1	3006190-99	A10 Large Keypad – German
A10	1	3006190-102	A10 Large Keypad – French
A10	1	3006190-105	A10 Large Keypad – Spanish
A10	1	3006190-108	A10 Large Keypad – Italian
A10	1	3006190-111	A10 Large Keypad – Swedish
A10	1	3006190-114	A10 Large Keypad – Danish
A10	1	3006190-117	A10 Large Keypad – Portuguese
A10	1	3006190-120	A10 Large Keypad – Norwegian
A10	1	3006190-123	A10 Large Keypad – Dutch
A10	1	3006190-126	A10 Large Keypad – Polish
A10	1	3006190-129	A10 Large Keypad – Finnish

A10 Large Keypad Language



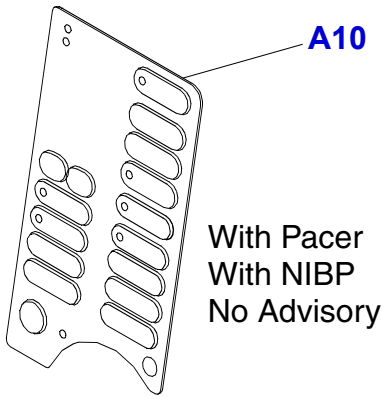
Item	Quantity	Part Number	Part Description
A10	1	3006190-134	A10 Large Keypad – English
A10	1	3006190-137	A10 Large Keypad – German
A10	1	3006190-140	A10 Large Keypad – French
A10	1	3006190-143	A10 Large Keypad – Spanish
A10	1	3006190-146	A10 Large Keypad – Italian
A10	1	3006190-149	A10 Large Keypad – Swedish
A10	1	3006190-152	A10 Large Keypad – Danish
A10	1	3006190-155	A10 Large Keypad – Portuguese
A10	1	3006190-158	A10 Large Keypad – Norwegian
A10	1	3006190-161	A10 Large Keypad – Dutch
A10	1	3006190-164	A10 Large Keypad – Polish
A10	1	3006190-167	A10 Large Keypad – Finnish

A10 Large Keypad Language



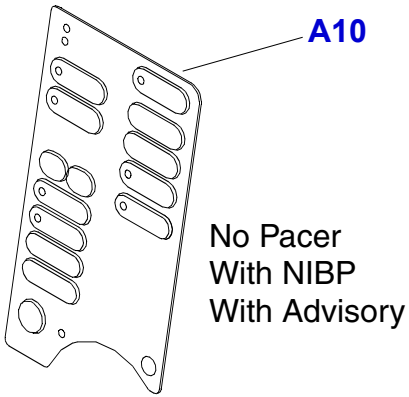
Item	Quantity	Part Number	Part Description
A10	1	3006190-133	A10 Large Keypad – English
A10	1	3006190-136	A10 Large Keypad – German
A10	1	3006190-139	A10 Large Keypad – French
A10	1	3006190-142	A10 Large Keypad – Spanish
A10	1	3006190-145	A10 Large Keypad – Italian
A10	1	3006190-148	A10 Large Keypad – Swedish
A10	1	3006190-151	A10 Large Keypad – Danish
A10	1	3006190-154	A10 Large Keypad – Portuguese
A10	1	3006190-157	A10 Large Keypad – Norwegian
A10	1	3006190-160	A10 Large Keypad – Dutch
A10	1	3006190-163	A10 Large Keypad – Polish
A10	1	3006190-166	A10 Large Keypad – Finnish

A10 Large Keypad Language



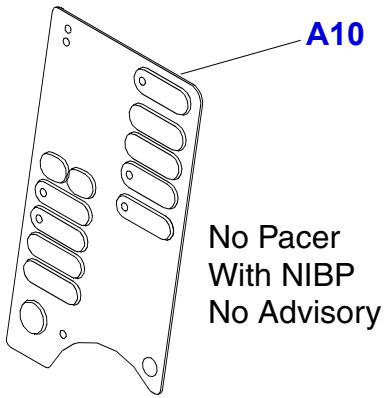
Item	Quantity	Part Number	Part Description
A10	1	3006190-132	A10 Large Keypad – English
A10	1	3006190-135	A10 Large Keypad – German
A10	1	3006190-138	A10 Large Keypad – French
A10	1	3006190-141	A10 Large Keypad – Spanish
A10	1	3006190-144	A10 Large Keypad – Italian
A10	1	3006190-147	A10 Large Keypad – Swedish
A10	1	3006190-150	A10 Large Keypad – Danish
A10	1	3006190-153	A10 Large Keypad – Portuguese
A10	1	3006190-156	A10 Large Keypad – Norwegian
A10	1	3006190-159	A10 Large Keypad – Dutch
A10	1	3006190-162	A10 Large Keypad – Polish
A10	1	3006190-165	A10 Large Keypad – Finnish

A10 Large Keypad Language



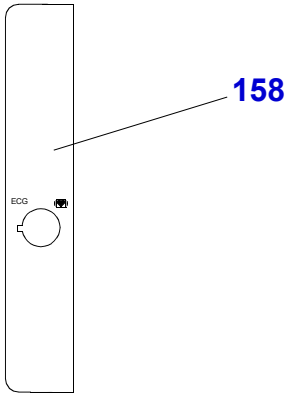
Item	Quantity	Part Number	Part Description
A10	1	3006190-168	A10 Large Keypad – English
A10	1	3006190-169	A10 Large Keypad – German
A10	1	3006190-170	A10 Large Keypad – French
A10	1	3006190-171	A10 Large Keypad – Spanish
A10	1	3006190-172	A10 Large Keypad – Italian
A10	1	3006190-173	A10 Large Keypad – Swedish
A10	1	3006190-174	A10 Large Keypad – Danish
A10	1	3006190-175	A10 Large Keypad – Portuguese
A10	1	3006190-176	A10 Large Keypad – Norwegian
A10	1	3006190-177	A10 Large Keypad – Dutch
A10	1	3006190-178	A10 Large Keypad – Polish
A10	1	3006190-179	A10 Large Keypad – Finnish

A10 Large Keypad Language



Item	Quantity	Part Number	Part Description
A10	1	3006190-180	A10 Large Keypad – English
A10	1	3006190-181	A10 Large Keypad – German
A10	1	3006190-182	A10 Large Keypad – French
A10	1	3006190-183	A10 Large Keypad – Spanish
A10	1	3006190-184	A10 Large Keypad – Italian
A10	1	3006190-185	A10 Large Keypad – Swedish
A10	1	3006190-186	A10 Large Keypad – Danish
A10	1	3006190-187	A10 Large Keypad – Portuguese
A10	1	3006190-188	A10 Large Keypad – Norwegian
A10	1	3006190-189	A10 Large Keypad – Dutch
A10	1	3006190-190	A10 Large Keypad – Polish
A10	1	3006190-191	A10 Large Keypad – Finnish

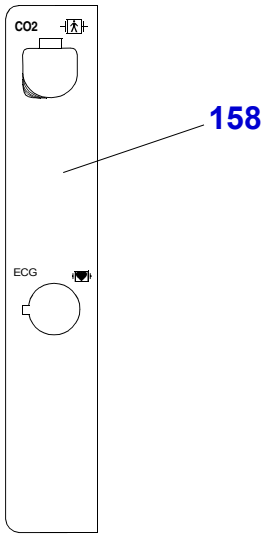
Parameter Bezel Label Language



No Options

Item	Quantity	Part Number	Part Description
158	1	3006241-00	Parameter Bezel Label – English
158	1	3006241-05	Parameter Bezel Label – German
158	1	3006241-00	Parameter Bezel Label – French
158	1	3006241-00	Parameter Bezel Label – Spanish
158	1	3006241-00	Parameter Bezel Label – Italian
158	1	3006241-05	Parameter Bezel Label – Swedish
158	1	3006241-05	Parameter Bezel Label – Danish
158	1	3006241-00	Parameter Bezel Label – Portuguese
158	1	3006241-05	Parameter Bezel Label – Norwegian
158	1	3006241-00	Parameter Bezel Label – Dutch
158	1	3006241-00	Parameter Bezel Label – Polish
158	1	3006241-05	Parameter Bezel Label – Finnish

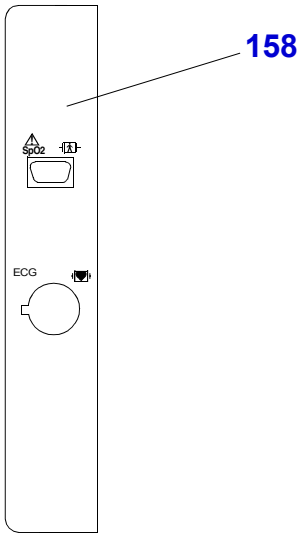
Parameter Bezel Label Language



With CO2

Item	Quantity	Part Number	Part Description
158	1	3006241-55	Parameter Bezel Label – English
158	1	3006241-56	Parameter Bezel Label – German
158	1	3006241-55	Parameter Bezel Label – French
158	1	3006241-55	Parameter Bezel Label – Spanish
158	1	3006241-55	Parameter Bezel Label – Italian
158	1	3006241-56	Parameter Bezel Label – Swedish
158	1	3006241-56	Parameter Bezel Label – Danish
158	1	3006241-55	Parameter Bezel Label – Portuguese
158	1	3006241-56	Parameter Bezel Label – Norwegian
158	1	3006241-55	Parameter Bezel Label – Dutch
158	1	3006241-55	Parameter Bezel Label – Polish
158	1	3006241-56	Parameter Bezel Label – Finnish

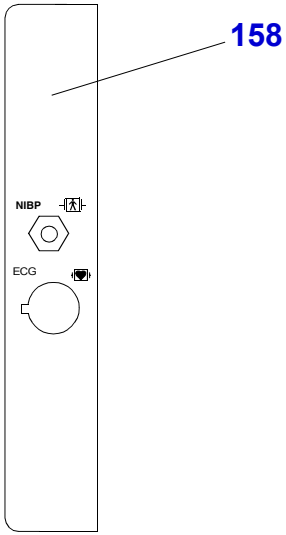
Parameter Bezel Label Language



With SpO2

Item	Quantity	Part Number	Part Description
158	1	3006241-01	Parameter Bezel Label – English
158	1	3006241-06	Parameter Bezel Label – German
158	1	3006241-01	Parameter Bezel Label – French
158	1	3006241-01	Parameter Bezel Label – Spanish
158	1	3006241-01	Parameter Bezel Label – Italian
158	1	3006241-06	Parameter Bezel Label – Swedish
158	1	3006241-06	Parameter Bezel Label – Danish
158	1	3006241-01	Parameter Bezel Label – Portuguese
158	1	3006241-06	Parameter Bezel Label – Norwegian
158	1	3006241-01	Parameter Bezel Label – Dutch
158	1	3006241-01	Parameter Bezel Label – Polish
158	1	3006241-06	Parameter Bezel Label – Finnish

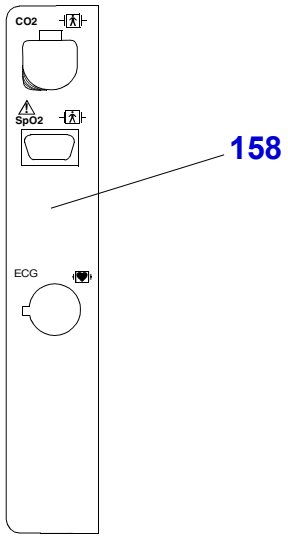
Parameter Bezel Label Language



With NIBP

Item	Quantity	Part Number	Part Description
158	1	3006241-35	Parameter Bezel Label – English
158	1	3006241-37	Parameter Bezel Label – German
158	1	3006241-36	Parameter Bezel Label – French
158	1	3006241-38	Parameter Bezel Label – Spanish
158	1	3006241-39	Parameter Bezel Label – Italian
158	1	3006241-37	Parameter Bezel Label – Swedish
158	1	3006241-37	Parameter Bezel Label – Danish
158	1	3006241-35	Parameter Bezel Label – Portuguese
158	1	3006241-37	Parameter Bezel Label – Norwegian
158	1	3006241-35	Parameter Bezel Label – Dutch
158	1	3006241-35	Parameter Bezel Label – Polish
158	1	3006241-37	Parameter Bezel Label – Finnish

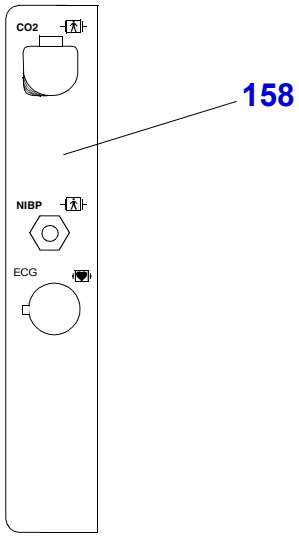
Parameter Bezel Label Language



With CO2 and SpO2

Item	Quantity	Part Number	Part Description
158	1	3006241-45	Parameter Bezel Label – English
158	1	3006241-46	Parameter Bezel Label – German
158	1	3006241-45	Parameter Bezel Label – French
158	1	3006241-45	Parameter Bezel Label – Spanish
158	1	3006241-45	Parameter Bezel Label – Italian
158	1	3006241-46	Parameter Bezel Label – Swedish
158	1	3006241-46	Parameter Bezel Label – Danish
158	1	3006241-45	Parameter Bezel Label – Portuguese
158	1	3006241-45	Parameter Bezel Label – Norwegian
158	1	3006241-45	Parameter Bezel Label – Dutch
158	1	3006241-45	Parameter Bezel Label – Polish
158	1	3006241-46	Parameter Bezel Label – Finnish

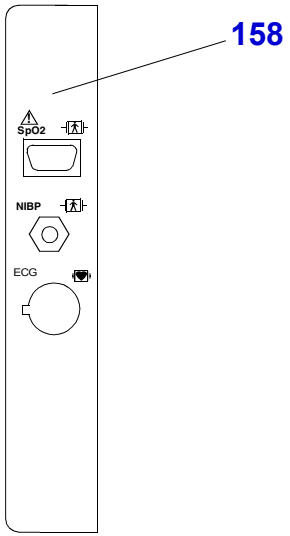
Parameter Bezel Label Language



With CO2 and NIBP

Item	Quantity	Part Number	Part Description
158	1	3006241-51	Parameter Bezel Label – English
158	1	3006241-52	Parameter Bezel Label – German
158	1	3006241-53	Parameter Bezel Label – French
158	1	3006241-53	Parameter Bezel Label – Spanish
158	1	3006241-54	Parameter Bezel Label – Italian
158	1	3006241-52	Parameter Bezel Label – Swedish
158	1	3006241-52	Parameter Bezel Label – Danish
158	1	3006241-53	Parameter Bezel Label – Portuguese
158	1	3006241-52	Parameter Bezel Label – Norwegian
158	1	3006241-51	Parameter Bezel Label – Dutch
158	1	3006241-51	Parameter Bezel Label – Polish
158	1	3006241-52	Parameter Bezel Label – Finnish

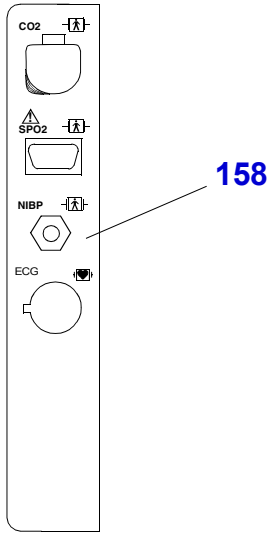
Parameter Bezel Label Language



With SpO2 and NIBP

Item	Quantity	Part Number	Part Description
158	1	3006241-17	Parameter Bezel Label – English
158	1	3006241-20	Parameter Bezel Label – German
158	1	3006241-21	Parameter Bezel Label – French
158	1	3006241-21	Parameter Bezel Label – Spanish
158	1	3006241-22	Parameter Bezel Label – Italian
158	1	3006241-20	Parameter Bezel Label – Swedish
158	1	3006241-20	Parameter Bezel Label – Danish
158	1	3006241-21	Parameter Bezel Label – Portuguese
158	1	3006241-20	Parameter Bezel Label – Norwegian
158	1	3006241-17	Parameter Bezel Label – Dutch
158	1	3006241-17	Parameter Bezel Label – Polish
158	1	3006241-20	Parameter Bezel Label – Finnish

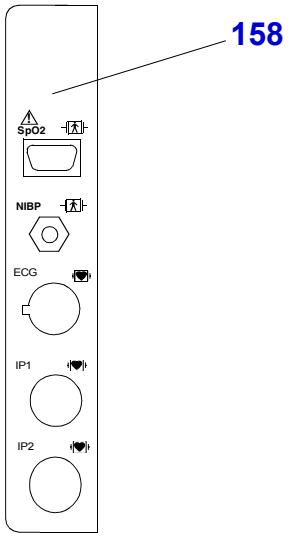
Parameter Bezel Label Language



With CO2 and SpO2 and NIBP

Item	Quantity	Part Number	Part Description
158	1	3006241-47	Parameter Bezel Label – English
158	1	3006241-48	Parameter Bezel Label – German
158	1	3006241-49	Parameter Bezel Label – French
158	1	3006241-49	Parameter Bezel Label – Spanish
158	1	3006241-50	Parameter Bezel Label – Italian
158	1	3006241-48	Parameter Bezel Label – Swedish
158	1	3006241-48	Parameter Bezel Label – Danish
158	1	3006241-49	Parameter Bezel Label – Portuguese
158	1	3006241-48	Parameter Bezel Label – Norwegian
158	1	3006241-47	Parameter Bezel Label – Dutch
158	1	3006241-47	Parameter Bezel Label – Polish
158	1	3006241-48	Parameter Bezel Label – Finnish

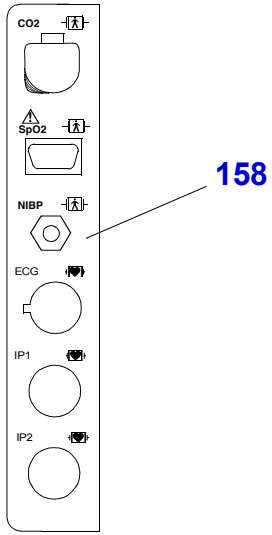
Parameter Bezel Label Language



With SpO2, NIBP, and IP

Item	Quantity	Part Number	Part Description
158	1	3006241-57	Parameter Bezel Label – English
158	1	3006241-59	Parameter Bezel Label – German
158	1	3006241-58	Parameter Bezel Label – French
158	1	3006241-60	Parameter Bezel Label – Spanish
158	1	3006241-61	Parameter Bezel Label – Italian
158	1	3006241-59	Parameter Bezel Label – Swedish
158	1	3006241-59	Parameter Bezel Label – Danish
158	1	3006241-60	Parameter Bezel Label – Portuguese
158	1	3006241-59	Parameter Bezel Label – Norwegian
158	1	3006241-57	Parameter Bezel Label – Dutch
158	1	3006241-57	Parameter Bezel Label – Polish
158	1	3006241-59	Parameter Bezel Label – Finnish

Parameter Bezel Label Language



With CO2, SpO2, NIBP, and IP

Item	Quantity	Part Number	Part Description
158	1	3006241-40	Parameter Bezel Label – English
158	1	3006241-42	Parameter Bezel Label – German
158	1	3006241-43	Parameter Bezel Label – Spanish
158	1	3006241-44	Parameter Bezel Label – Italian
158	1	3006241-42	Parameter Bezel Label – Swedish
158	1	3006241-42	Parameter Bezel Label – Danish
158	1	3006241-43	Parameter Bezel Label – Portuguese
158	1	3006241-42	Parameter Bezel Label – Norwegian
158	1	3006241-40	Parameter Bezel Label – Dutch
158	1	3006241-40	Parameter Bezel Label – Polish
158	1	3006241-42	Parameter Bezel Label – Finnish
158	1	3006241-41	Parameter Bezel Label – French

Product Identification Label Language—Edmark Devices

Item	Quantity	Part Number	Part Description
162	1	3009058-00	Product Identification Label – English
162	1	3009058-01	Product Identification Label – German
162	1	3009058-02	Product Identification Label – French
162	1	3009058-03	Product Identification Label – Spanish
162	1	3009058-04	Product Identification Label – Italian
162	1	3009058-05	Product Identification Label – Swedish
162	1	3009058-06	Product Identification Label – Danish
162	1	3009058-07	Product Identification Label – Portuguese
162	1	3009058-08	Product Identification Label – Norway
162	1	3009058-09	Product Identification Label – Dutch
162	1	3009058-10	Product Identification Label – Finnish
162	1	3009058-11	Product Identification Label – Polish

Product Identification Label Language—Biphasic Devices

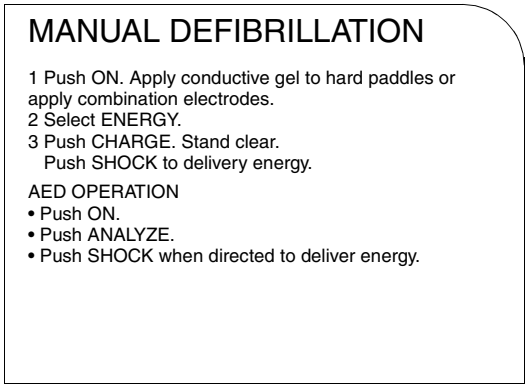
Item	Quantity	Part Number	Part Description
162	1	3009058-031	Product Identification Label – English
162	1	3009058-032	Product Identification Label – German
162	1	3009058-033	Product Identification Label – French
162	1	3009058-034	Product Identification Label – Spanish/Portuguese
162	1	3009058-035	Product Identification Label – Italian
162	1	3009058-17	Product Identification Label – Swedish
162	1	3009058-036	Product Identification Label – Danish/Norwegian
162	1	3009058-21	Product Identification Label – Dutch
162	1	3009058-22	Product Identification Label – Finnish
162	1	3009058-23	Product Identification Label – Polish

Explosion/Hazard Label Language

DANGER EXPLOSION HAZARD. DO NOT USE IN THE PRESENCE OF FLAMMABLE GASES.
WARNING HAZARDOUS ELECTRICAL OUTPUT. FOR USE ONLY BY QUALIFIED PERSONNEL.
164

Item	Quantity	Part Number	Part Description
164	1	3009059-00	Explosion/Hazard Label – English
164	1	3009059-01	Explosion/Hazard Label – German
164	1	3009059-02	Explosion/Hazard Label – French
164	1	3009059-03	Explosion/Hazard Label – Spanish
164	1	3009059-04	Explosion/Hazard Label – Italian
164	1	3009059-05	Explosion/Hazard Label – Swedish
164	1	3009059-06	Explosion/Hazard Label – Danish
164	1	3009059-07	Explosion/Hazard Label – Portuguese
164	1	3009059-08	Explosion/Hazard Label – Norwegian
164	1	3009059-09	Explosion/Hazard Label – Dutch
164	1	3009059-10	Explosion/Hazard Label – Finnish
164	1	3009059-11	Explosion/Hazard Label – Polish

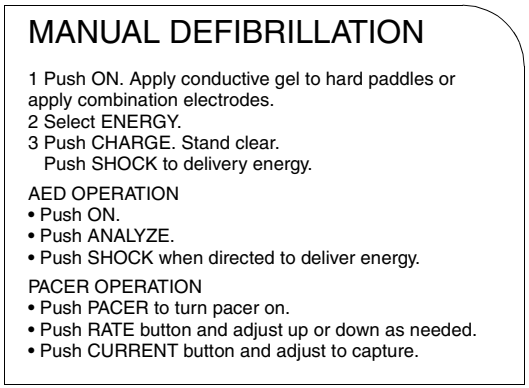
Operating Instruction Label Language


MANUAL DEFIBRILLATION
1 Push ON. Apply conductive gel to hard paddles or apply combination electrodes.
2 Select ENERGY.
3 Push CHARGE. Stand clear.
Push SHOCK to delivery energy.
AED OPERATION
• Push ON.
• Push ANALYZE.
• Push SHOCK when directed to deliver energy.

No Pacer,
with Advisory

Item	Quantity	Part Number	Part Description
170	1	3009064-12	Operating Instructions Label – English
170	1	3009064-13	Operating Instructions Label – German
170	1	3009064-14	Operating Instructions Label – French
170	1	3009064-15	Operating Instructions Label – Spanish
170	1	3009064-16	Operating Instructions Label – Italian
170	1	3009064-17	Operating Instructions Label – Swedish
170	1	3009064-24	Operating Instructions Label – Danish
170	1	3009064-25	Operating Instructions Label – Portuguese
170	1	3009064-26	Operating Instructions Label – Norwegian
170	1	3009064-27	Operating Instructions Label – Dutch
170	1	3009064-28	Operating Instructions Label – Finnish
170	1	3009064-29	Operating Instructions Label – Polish

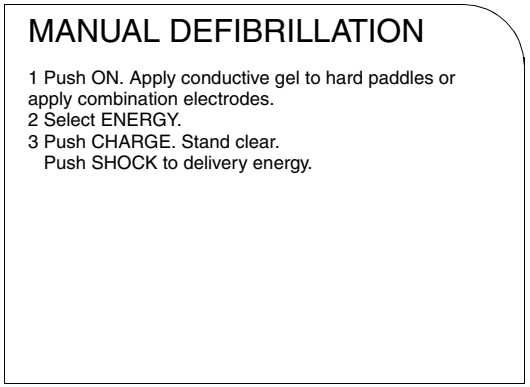
Operating Instruction Label Language


MANUAL DEFIBRILLATION
1 Push ON. Apply conductive gel to hard paddles or apply combination electrodes.
2 Select ENERGY.
3 Push CHARGE. Stand clear.
Push SHOCK to delivery energy.
AED OPERATION
• Push ON.
• Push ANALYZE.
• Push SHOCK when directed to deliver energy.
PACER OPERATION
• Push PACER to turn pacer on.
• Push RATE button and adjust up or down as needed.
• Push CURRENT button and adjust to capture.

With Pacer and Advisory

Item	Quantity	Part Number	Part Description
170	1	3009064-06	Operating Instructions Label – English
170	1	3009064-07	Operating Instructions Label – German
170	1	3009064-08	Operating Instructions Label – French
170	1	3009064-09	Operating Instructions Label – Spanish
170	1	3009064-10	Operating Instructions Label – Italian
170	1	3009064-11	Operating Instructions Label – Swedish
170	1	3009064-18	Operating Instructions Label – Danish
170	1	3009064-19	Operating Instructions Label – Portuguese
170	1	3009064-20	Operating Instructions Label – Norwegian
170	1	3009064-21	Operating Instructions Label – Dutch
170	1	3009064-22	Operating Instructions Label – Finnish
170	1	3009064-23	Operating Instructions Label – Polish

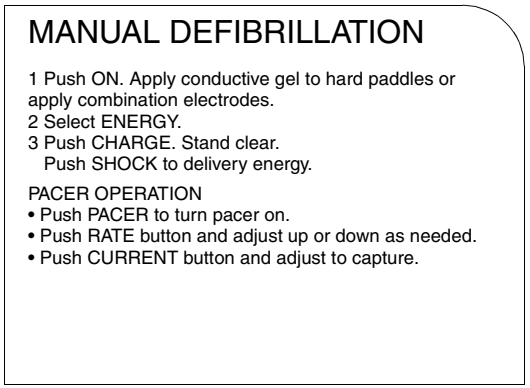
Operating Instruction Label Language


MANUAL DEFIBRILLATION
1 Push ON. Apply conductive gel to hard paddles or apply combination electrodes.
2 Select ENERGY.
3 Push CHARGE. Stand clear.
Push SHOCK to delivery energy.

No Pacer,
no Advisory

Item	Quantity	Part Number	Part Description
170	1	3009064-42	Operating Instructions Label – English
170	1	3009064-43	Operating Instructions Label – German
170	1	3009064-44	Operating Instructions Label – French
170	1	3009064-45	Operating Instructions Label – Spanish
170	1	3009064-46	Operating Instructions Label – Italian
170	1	3009064-47	Operating Instructions Label – Swedish
170	1	3009064-48	Operating Instructions Label – Danish
170	1	3009064-49	Operating Instructions Label – Portuguese
170	1	3009064-50	Operating Instructions Label – Norwegian
170	1	3009064-51	Operating Instructions Label – Dutch
170	1	3009064-52	Operating Instructions Label – Finnish
170	1	3009064-53	Operating Instructions Label – Polish

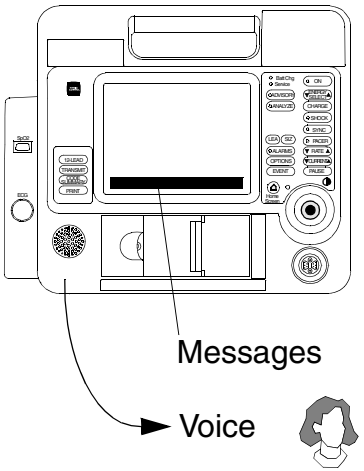
Operating Instruction Label Language


MANUAL DEFIBRILLATION
1 Push ON. Apply conductive gel to hard paddles or apply combination electrodes.
2 Select ENERGY.
3 Push CHARGE. Stand clear.
Push SHOCK to delivery energy.
PACER OPERATION
• Push PACER to turn pacer on.
• Push RATE button and adjust up or down as needed.
• Push CURRENT button and adjust to capture.

With Pacer,
no Advisory

Item	Quantity	Part Number	Part Description
170	1	3009064-30	Operating Instructions Label – English
170	1	3009064-31	Operating Instructions Label – German
170	1	3009064-32	Operating Instructions Label – French
170	1	3009064-33	Operating Instructions Label – Spanish
170	1	3009064-34	Operating Instructions Label – Italian
170	1	3009064-35	Operating Instructions Label – Swedish
170	1	3009064-36	Operating Instructions Label – Danish
170	1	3009064-37	Operating Instructions Label – Portuguese
170	1	3009064-38	Operating Instructions Label – Norwegian
170	1	3009064-39	Operating Instructions Label – Dutch
170	1	3009064-40	Operating Instructions Label – Finnish
170	1	3009064-41	Operating Instructions Label – Polish

Font and Voice Software Language



Item	Quantity	Part No	Dash*	Dash**	Part Description
Ref.	1	3011371	-047	-086	Font/Voice System Software – Korean
Ref.	1	3011371	-049	-081	Font/Voice System Software – Portuguese
Ref.	1	3011371	-050	-085	Font/Voice System Software – Finnish
Ref.	1	3011371	-051	-074	Font/Voice System Software – English
Ref.	1	3011371	-052	-075	Font/Voice System Software – French
Ref.	1	3011371	-053	-076	Font/Voice System Software – German
Ref.	1	3011371	-054	-077	Font/Voice System Software – Spanish
Ref.	1	3011371	-055	-078	Font/Voice System Software – Italian
Ref.	1	3011371	-056	-079	Font/Voice System Software – Swedish
Ref.	1	3011371	-057	-080	Font/Voice System Software – Danish
Ref.	1	3011371	-058	-082	Font/Voice System Software – Norwegian
Ref.	1	3011371	-059	-083	Font/Voice System Software – Dutch
Ref.	1	3011371	-060	-084	Font/Voice System Software – Polish
Ref.	1	3011371		-089	Font/Voice System Software – Japanese

* For Operating Software 3011371-018 to -070
** For Operating Software 3011371-072 to -090

A12 Printer (50 mm) Parts List

Item	Quantity	Part Number	Description	Note
A12	1	804189-02	50 mm Printer [see Mfg Date Note]	
902	2	806752-30	Printhead Bumper	
903	1	806752-38	Gear Cover (Also included with Motor Assembly)	
904	1	806752-73	Door Assembly (Includes Paper Ejector, Linkage Shaft, Dowel Pin, and Retaining Ring)	
905	1	806752-50	Idler Door Gear, 108 Tooth	
906	1	806752-48	Idler Motor Gear, 31 Tooth	
907	1	806752-72	Motor Assembly (with Bonded 15-Tooth Motor Gear with Keyshim, Cable/Connector, Mounting Screws, and Gear Cover)	
908	2	806752-71	Anti-static Pad	
909	1	806752-10	Printroller Assembly (with 32-Tooth Gear and Bearing)	
910	1	806752-69	Retaining Ring	
911	1	806752-44	Shaft Printroller	
912	1	806752-28	Door Open Spring Assembly	
913	2	806752-70	Paper Stripper	

A12 Printer (100 mm) Parts List

Item	Quantity	Part Number	Description	Note
A12	1	3006229-02	100 mm Printer	
1000	1	806752-112	Paper Cradle	
1001	1	806752-114	Motor Assembly with gear	
1002	1	806752-116	Door/Roller Assembly	

Standard Paddle Parts—Apex and Sternum

Item	Quantity	Part Number	Part Description	Note
800	1	804246-03	Sternum Paddle Cover	
801	1	804246-02	Apex Paddle Cover	
802	1	802902-05	Sternum Paddle Electrode Plate	
803	1	802902-04	Apex Paddle Electrode Plate	
804	2	802944-02	Paddle Gasket	
805	1	802931-03	Paddle Handle	
806	1	802931-02	Paddle Handle	
807	2	802932-00	I/M Key-Retainer Coil	
808	6	201508-004	Lock Nut CS 8-32 × 5/16	
809	1	200491-048	LED Panel Mount	
810	2	200536-001	Retainer Cable 10 W × 4.0 L	
811	14	201407-018	Screw 4-40 × .312 L	
812	2	804231-00	Paddle Shield	
813	4	804697-03	Switch	
814	1	3009277-01	Knob	

Standard Paddle Parts—Apex and Sternum

Item	Quantity	Part Number	Part Description	Note
815	1	3009762-00	PCB Assy	
816	1	202187-001	Retainer Knob	
817	2	802935-09	Pushbutton Discharge	
818	1	802935-25	Pushbutton Charge	English
818	1	802935-26	Pushbutton Charge	French
818	1	802935-27	Pushbutton Charge	German
818	1	802935-28	Pushbutton Charge	Spanish
818	1	802935-29	Pushbutton Charge	Italian
818	1	802935-30	Pushbutton Charge	Swedish
818	1	802935-31	Pushbutton Charge	Danish
818	1	802935-32	Pushbutton Charge	Portuguese
818	1	802935-33	Pushbutton Charge	Norwegian
818	1	802935-34	Pushbutton Charge	Dutch
818	1	802935-45	Pushbutton Charge	Finnish
818	1	802935-46	Pushbutton Charge	Polish

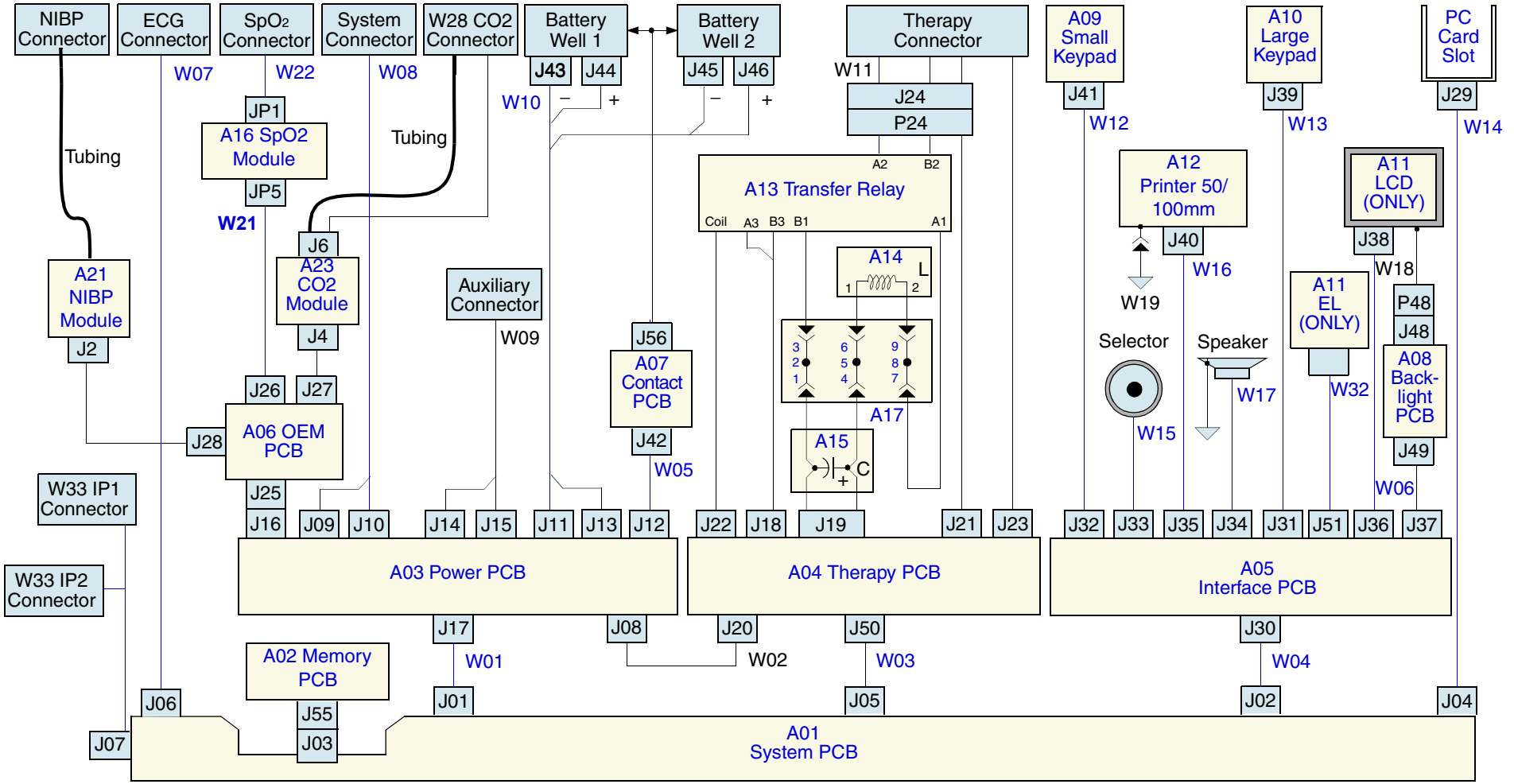
Standard Paddle Parts—Apex and Sternum

Item	Quantity	Part Number	Part Description	Note
819	1	802935-35	Pushbutton Print	English
819	1	802935-36	Pushbutton Print	French
819	1	802935-37	Pushbutton Print	German
819	1	802935-38	Pushbutton Print	Spanish, Portuguese
819	1	802935-39	Pushbutton Print	Italian
819	1	802935-40	Pushbutton Print	Swedish
819	1	802935-41	Pushbutton Print	Danish
819	1	802935-42	Pushbutton Print	Norwegian
819	1	802935-43	Pushbutton Print	Dutch
819	1	802935-47	Pushbutton Print	Finnish
819	1	802935-48	Pushbutton Print	Polish
820	1	804268-13	Sternum Paddle Label	English
820	1	804268-14	Sternum Paddle Label	French
820	1	804268-15	Sternum Paddle Label	German
820	1	804268-16	Sternum Paddle Label	Spanish

Standard Paddle Parts—Apex and Sternum

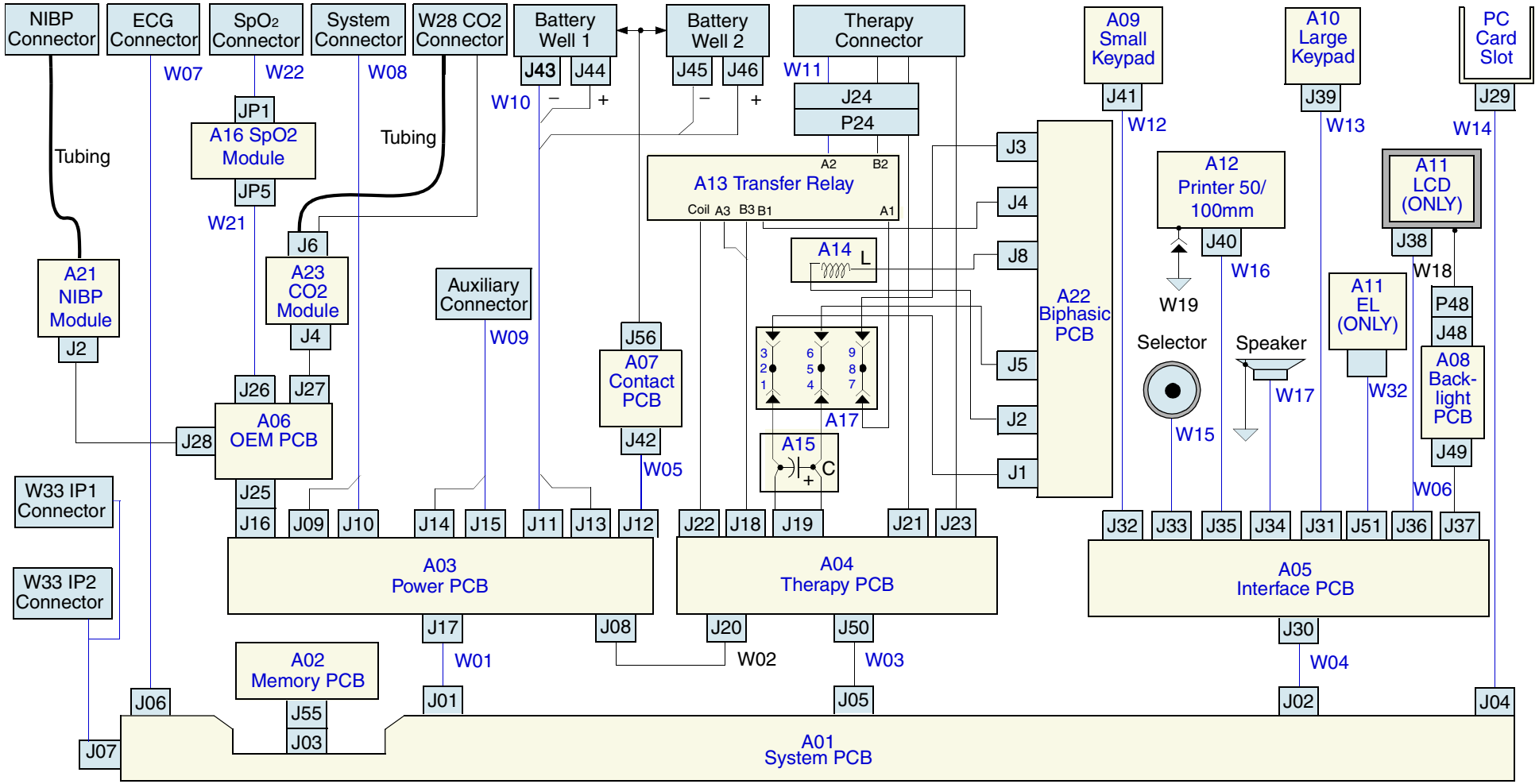
Item	Quantity	Part Number	Part Description	Note
820	1	804268-17	Sternum Paddle Label	Italian
820	1	804268-18	Sternum Paddle Label	Swedish
820	1	804268-19	Sternum Paddle Label	Danish
820	1	804268-20	Sternum Paddle Label	Portuguese
820	1	804268-21	Sternum Paddle Label	Norwegian
820	1	804268-22	Sternum Paddle Label	Dutch
820	1	804268-23	Sternum Paddle Label	Finnish
820	1	804268-24	Sternum Paddle Label	Polish
821	1	804267-04	Apex Paddle Label	English, French, German, Swedish, Danish, Dutch
821	1	804267-05	Apex Paddle Label	Spanish, Portuguese, Italian
821	1	804267-06	Apex Paddle Label	Norwegian
821	1	804267-07	Apex Paddle Label	Finnish
821	1	804267-08	Apex Paddle Label	Polish
822	1	805241-00	LED Grommet	

Interconnect Drawing—Edmark Devices Only



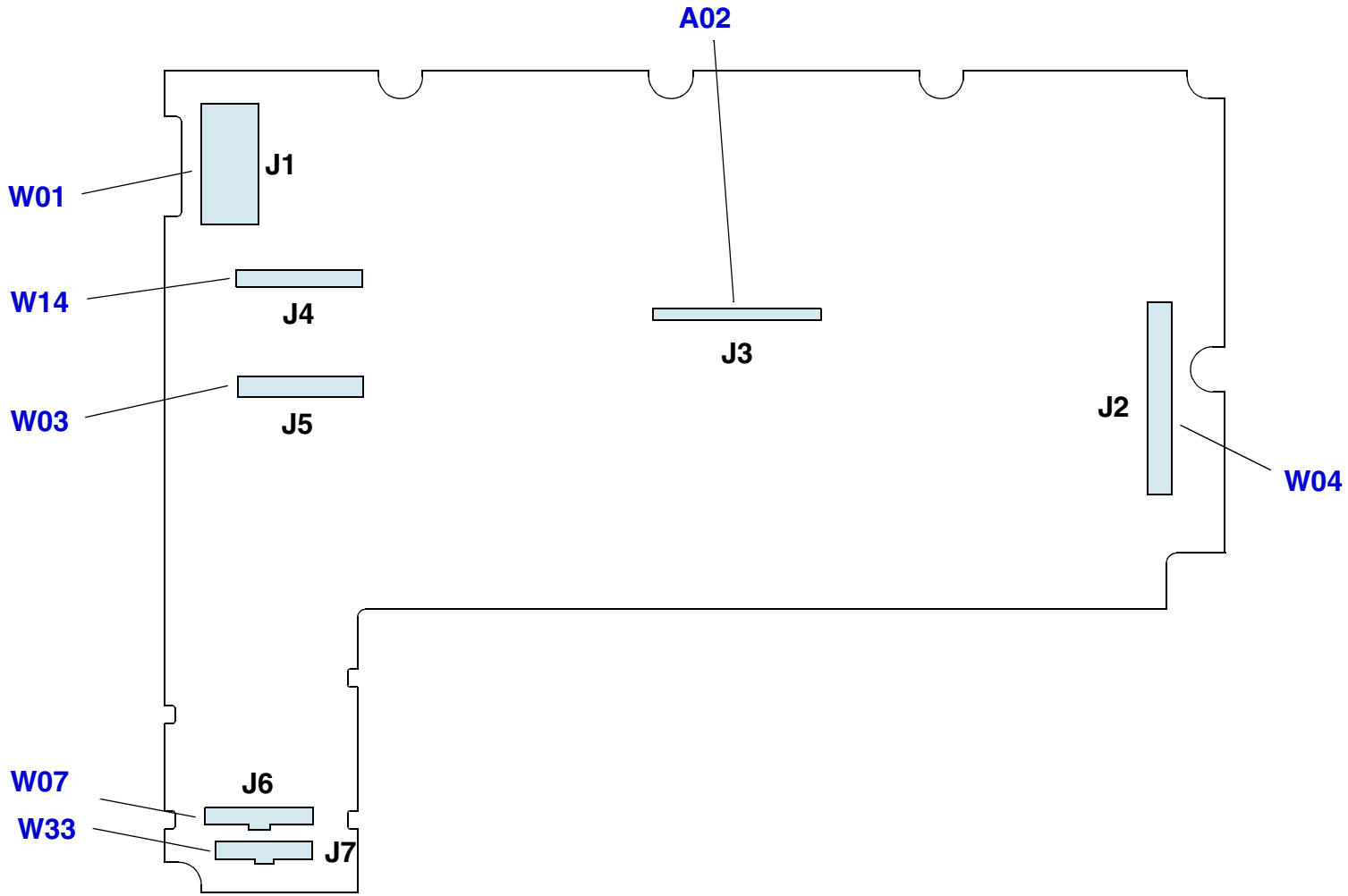
764

Interconnect Drawing—Biphasic Devices Only



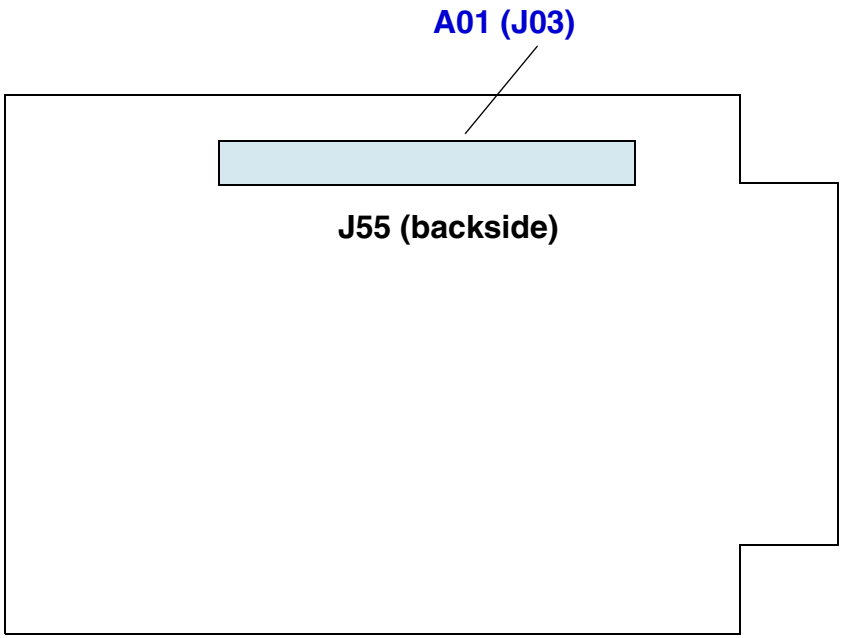
765

A01 System PCB, PN 3006227-08

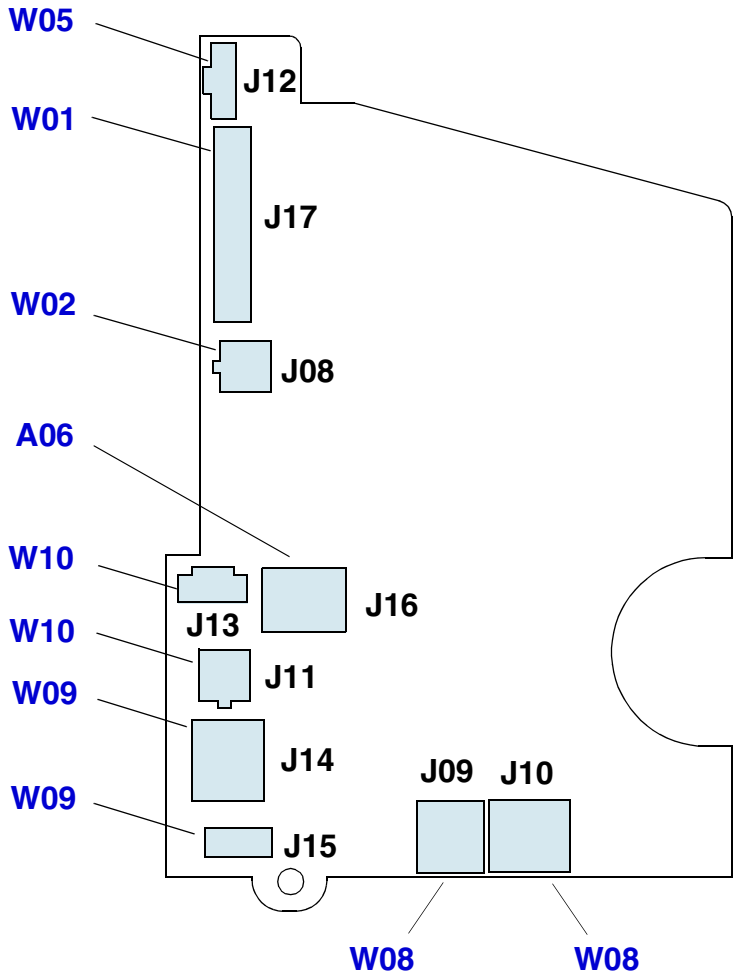


766

A02 Memory PCB, PN 3008520-05

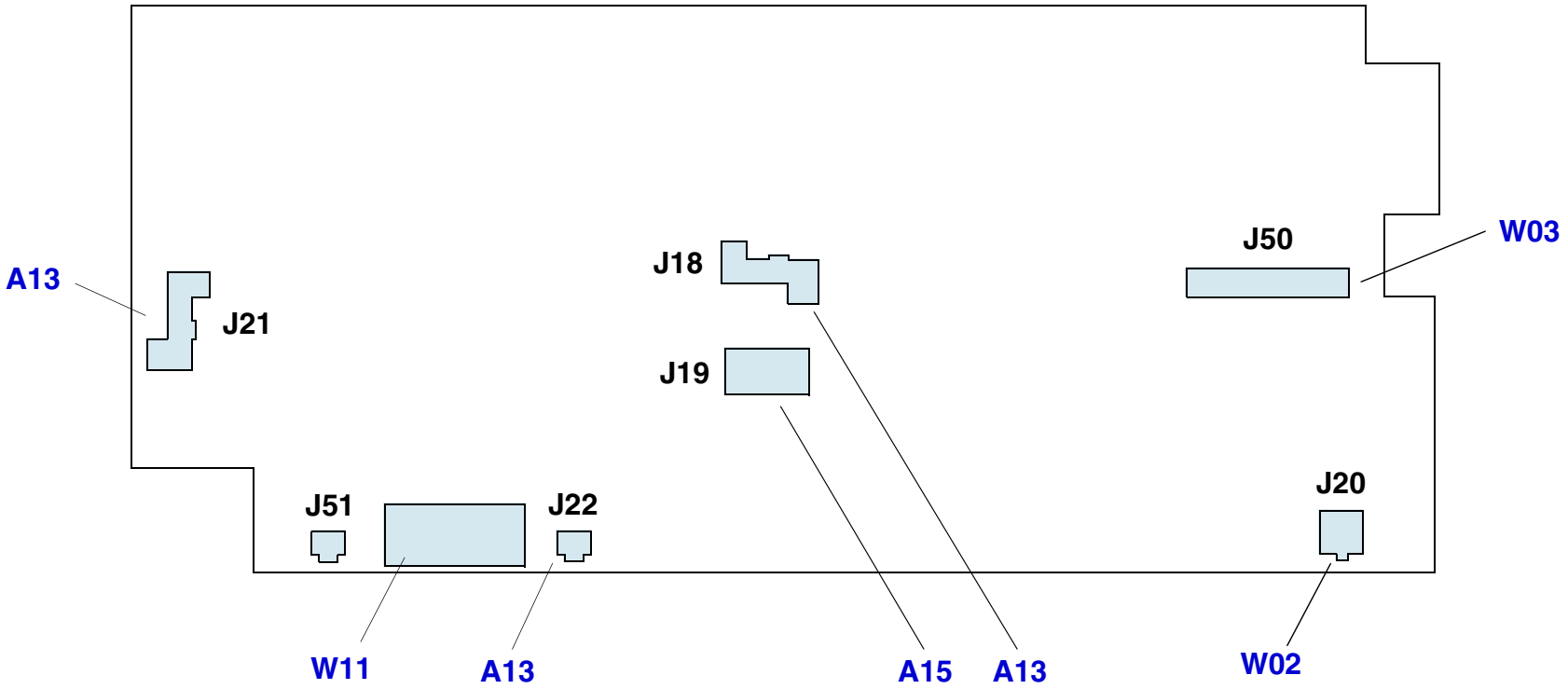


A03 Power PCB, PN 3006237-06



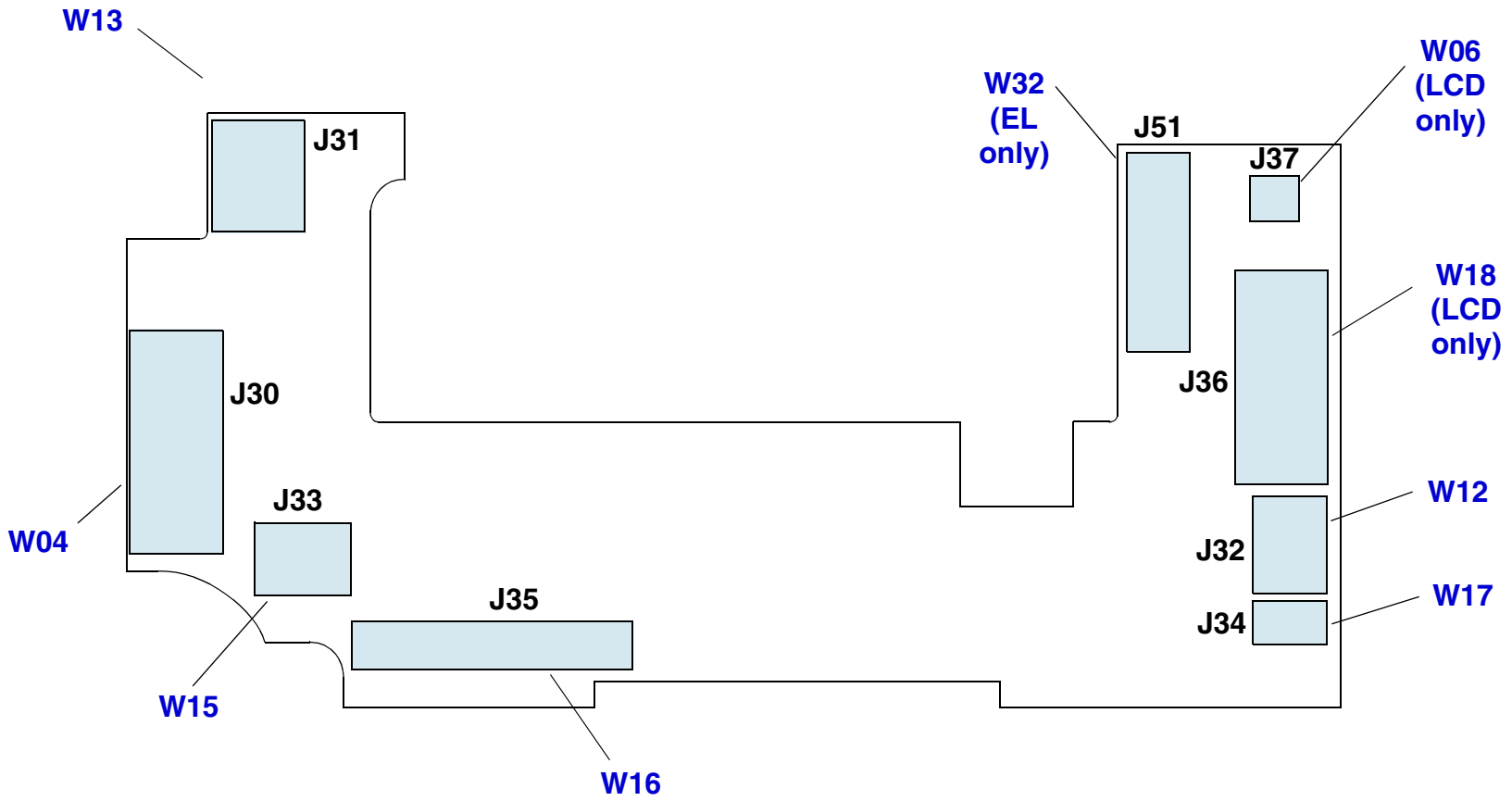
768

A04 Therapy PCB, PN 3006235-07—Edmark Devices / A04 Therapy PCB, PN 3006235-08—Biphasic Devices



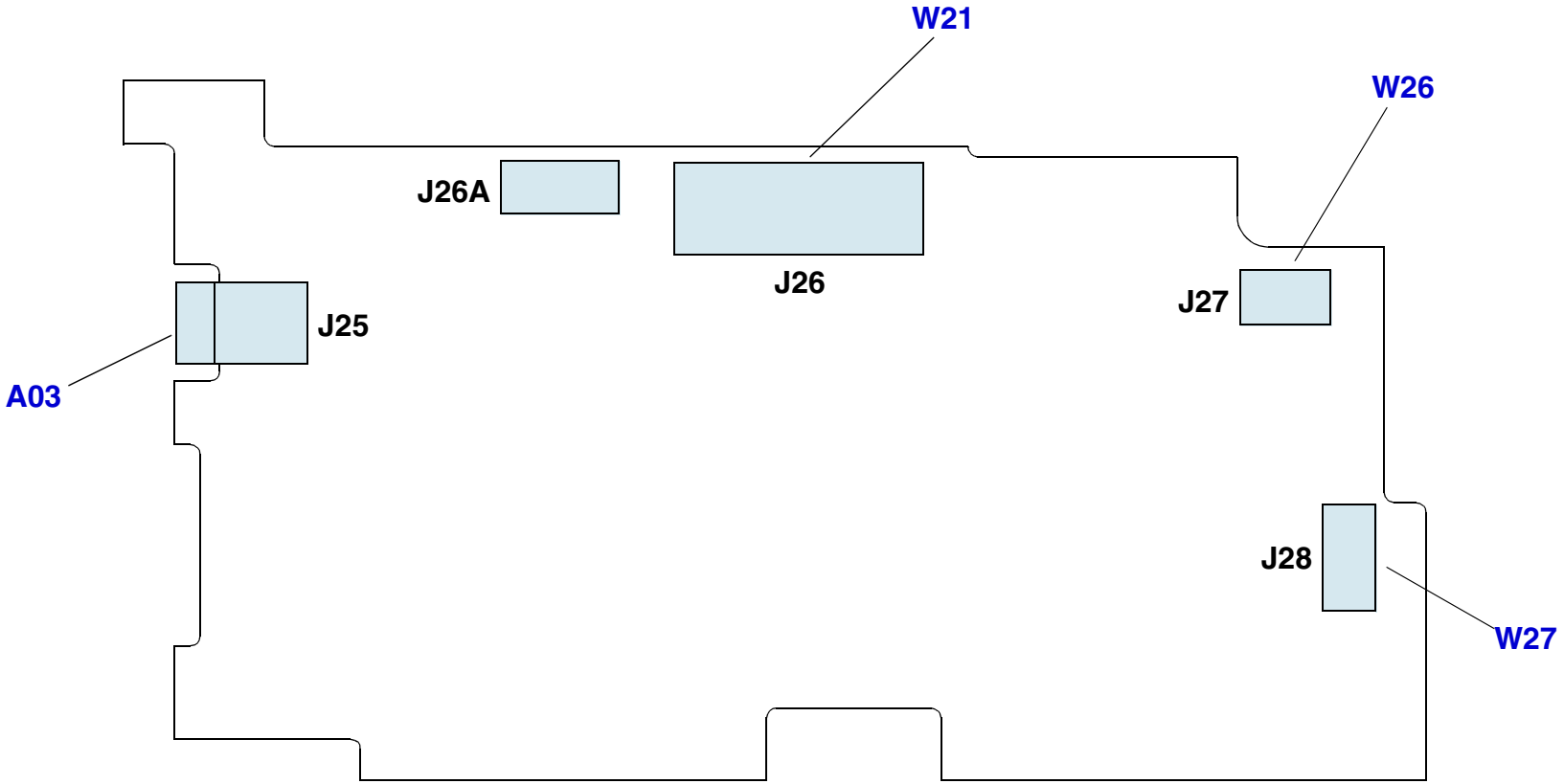
769

A05 Interface PCB, PN 3010524-04



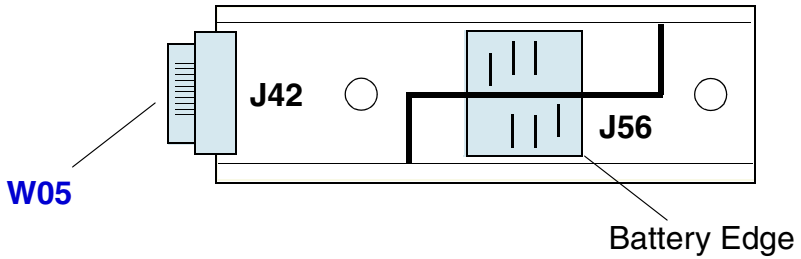
770

A06 OEM PCB Module, PN 3008541-08

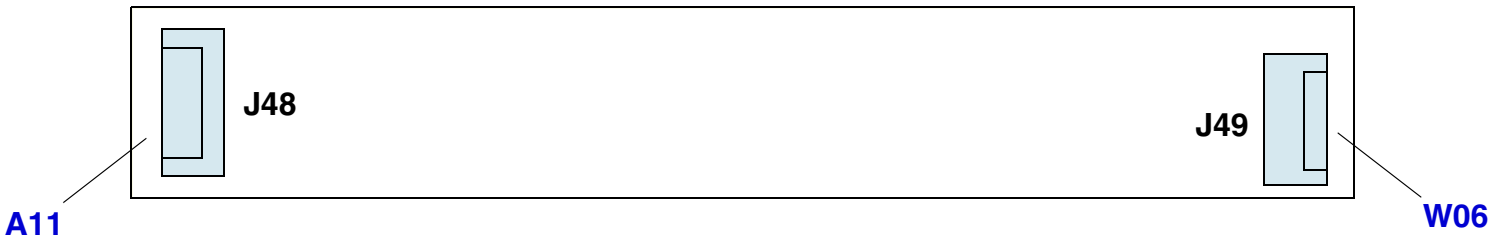


771

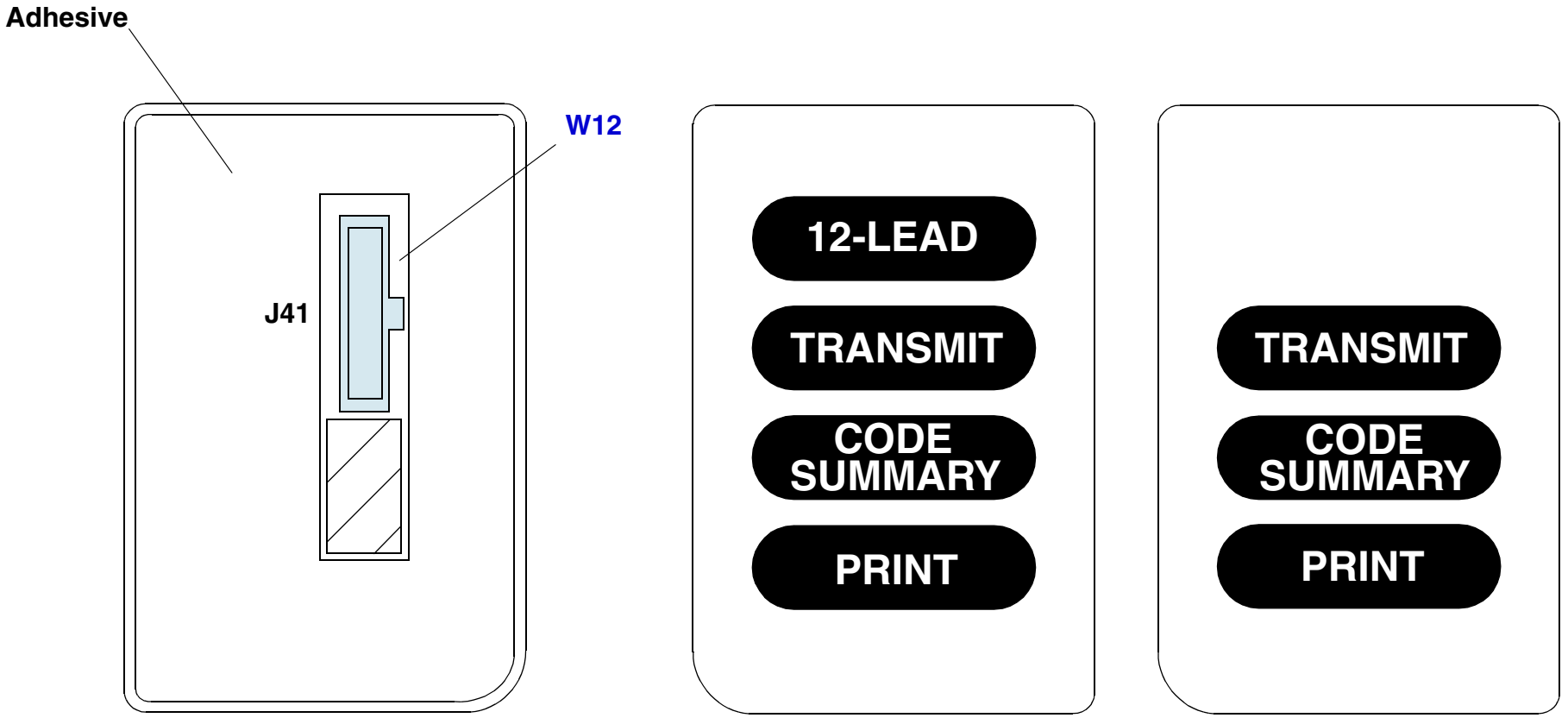
A07 Contact PCB Module, PN 3006394-02



A08 Backlight PCB, PN 3006806-00—LCD Only



A09 Small Keypad, Various Part Numbers



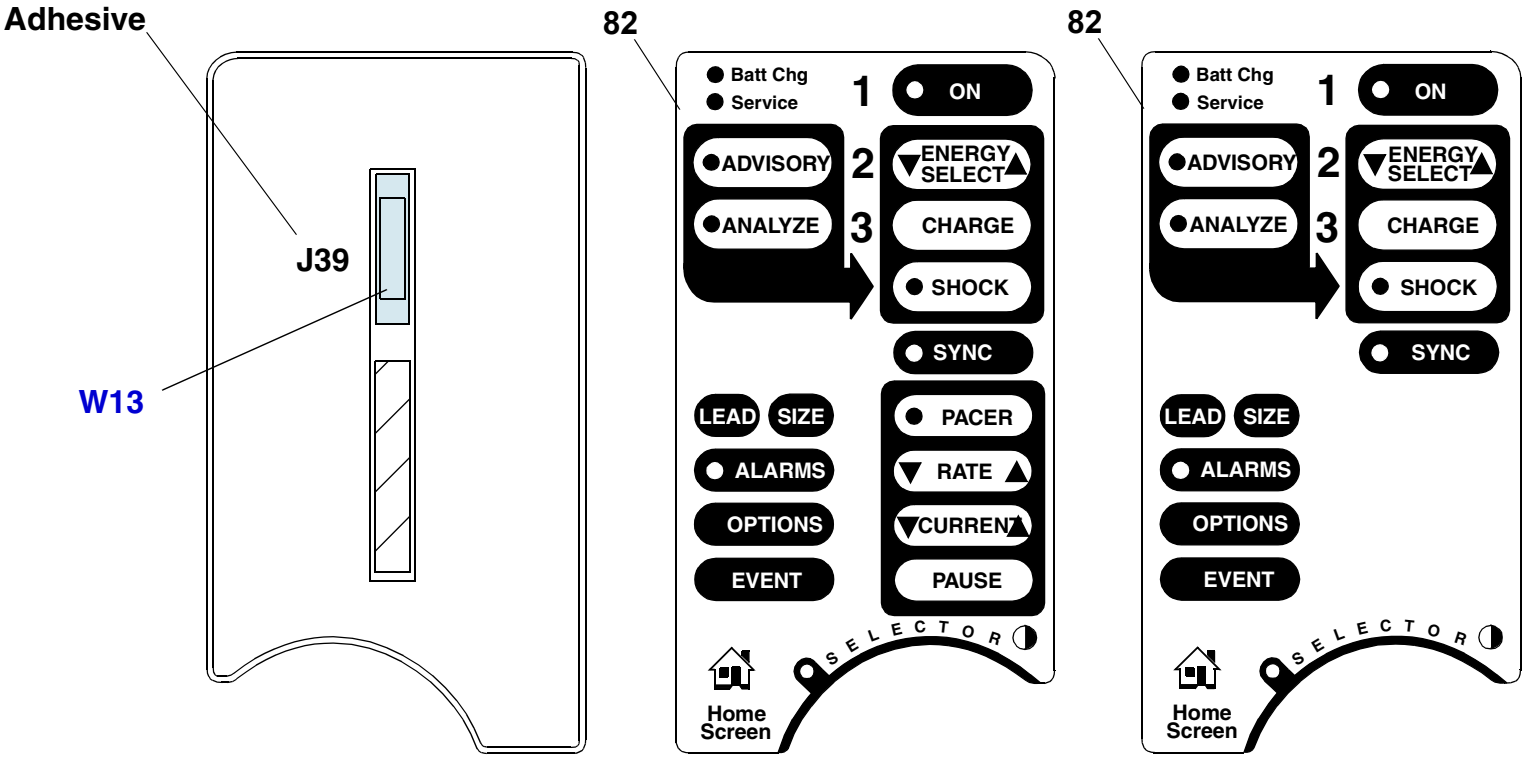
Rear View

12-Lead Configuration

3-Lead Configurations Standard

774

A10 Large Keypad, Various Part Numbers



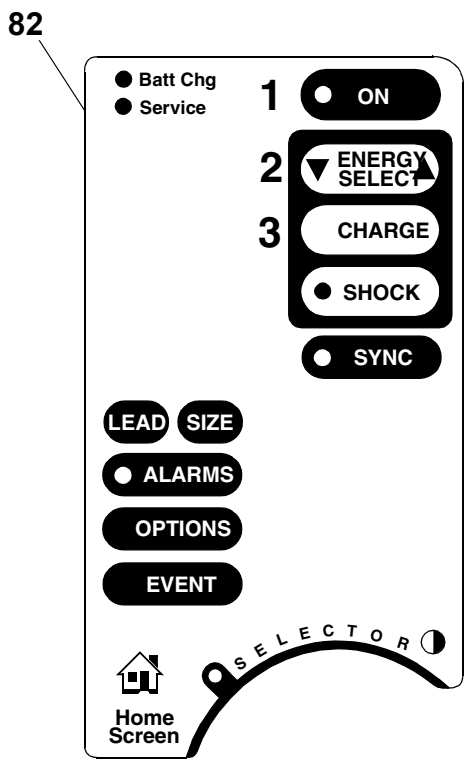
Rear View

With Pacer
No NIBP
With Advisory

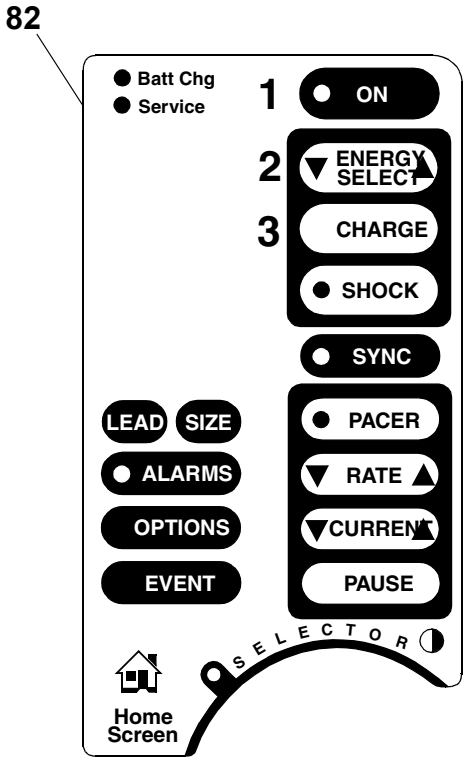
No Pacer
No NIBP
With Advisory

775

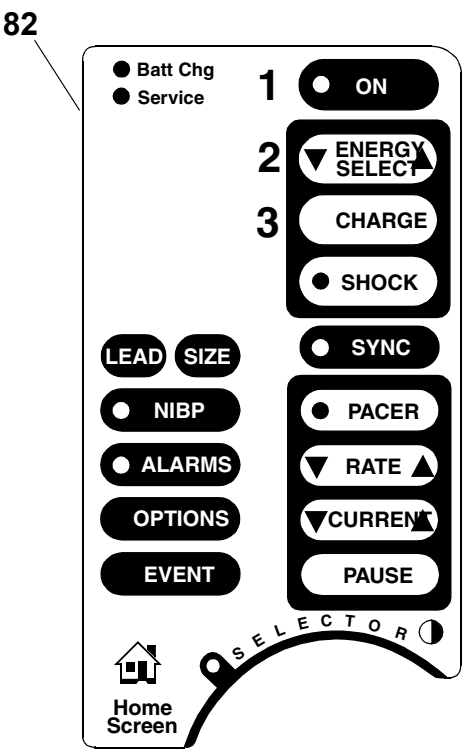
A10 Large Keypad



No Pacer
No NIBP
No Advisory



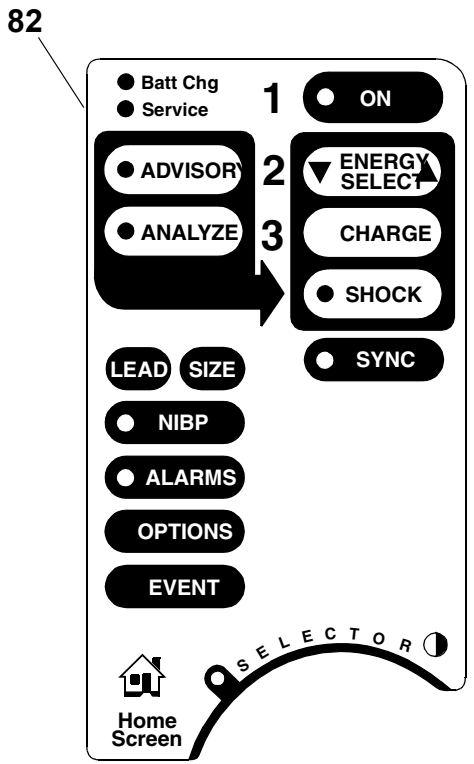
With Pacer
No NIBP
No Advisory



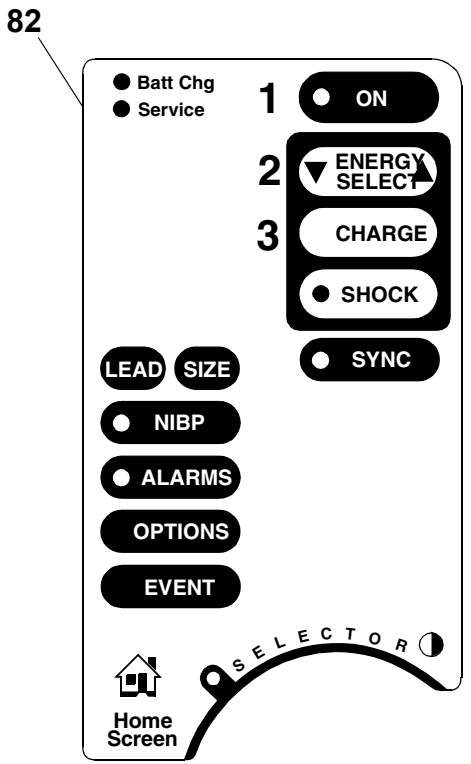
With Pacer
With NIBP
No Advisory

776

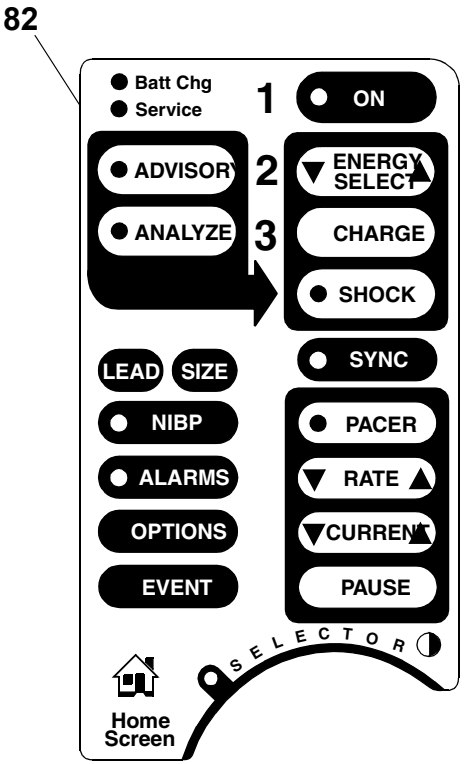
A10 Large Keypad



No Pacer
With NIBP
With Advisory



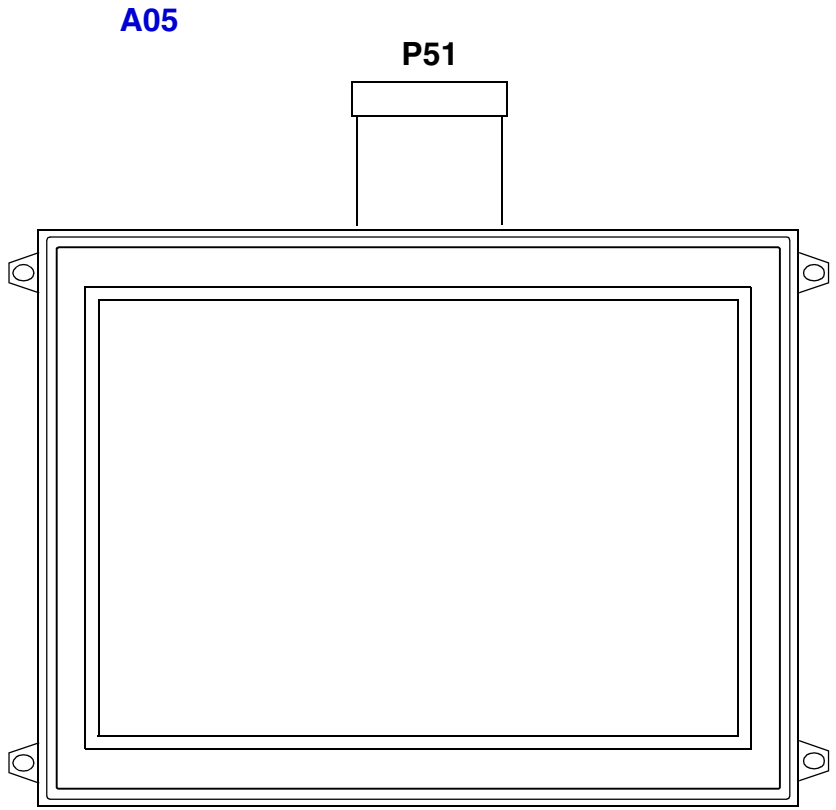
No Pacer
With NIBP
No Advisory



With Pacer
With NIBP
With Advisory

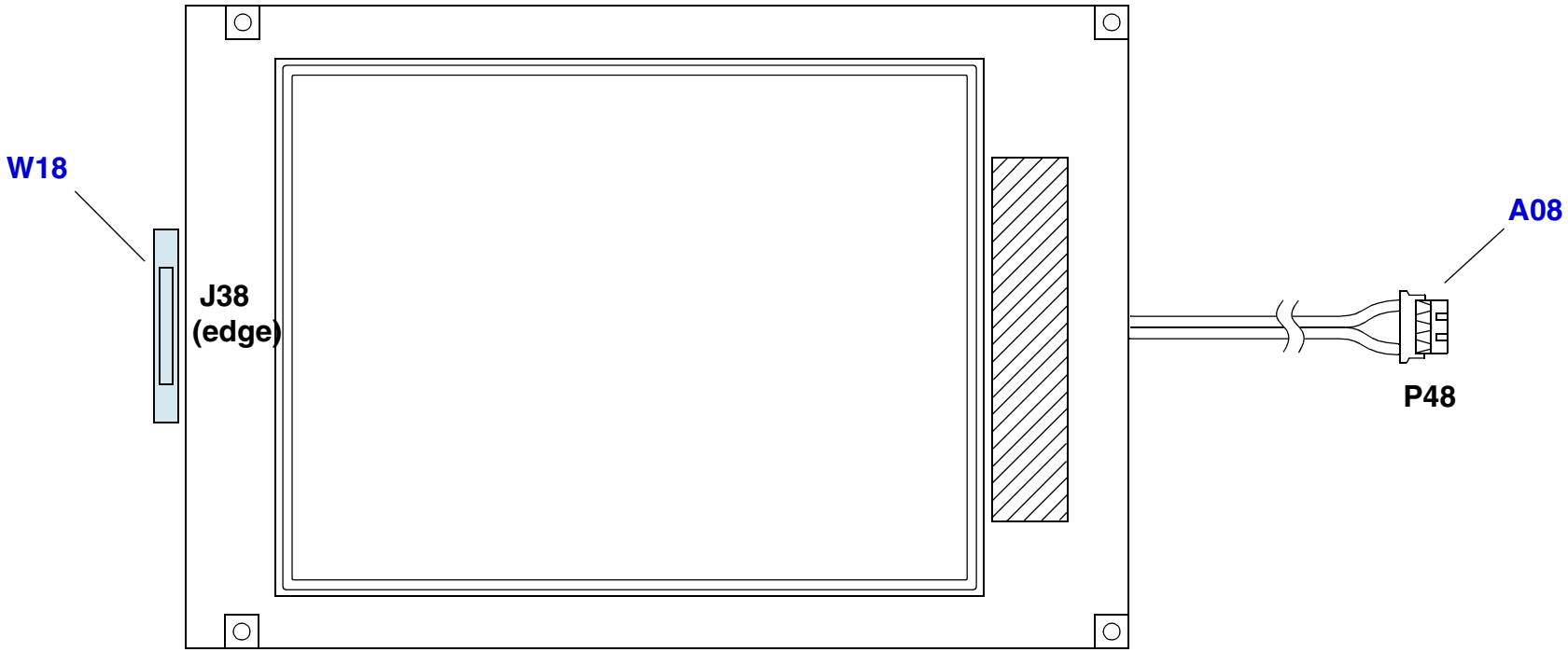
777

A11 EL Display Assembly, PN 3012695-000

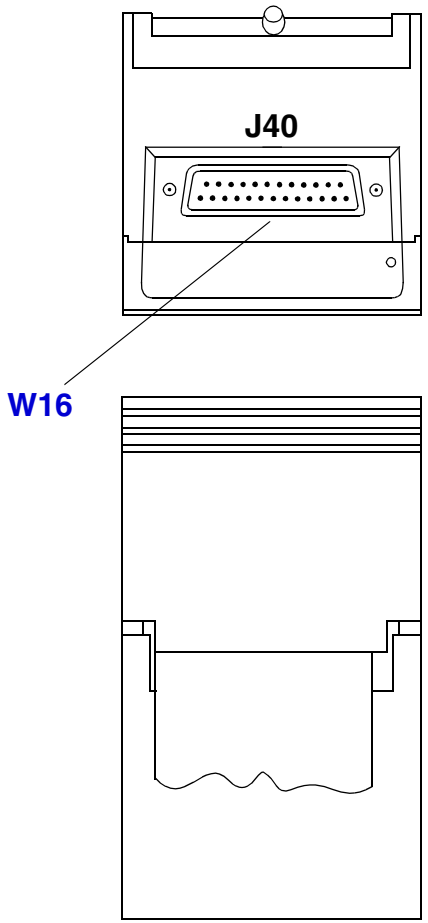


778

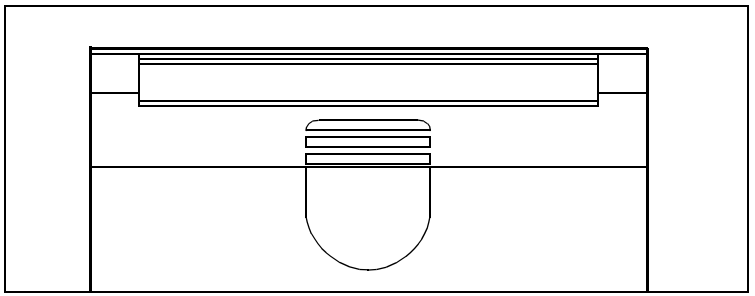
A11 LCD Assembly, PN 3010612-00



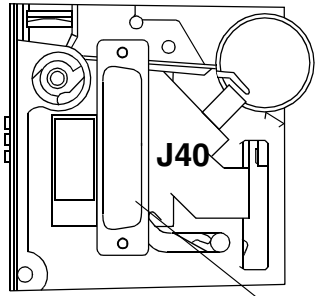
A12 Printer Assembly, Various Part Numbers



50 mm Thermal Printer



100 mm Thermal Printer



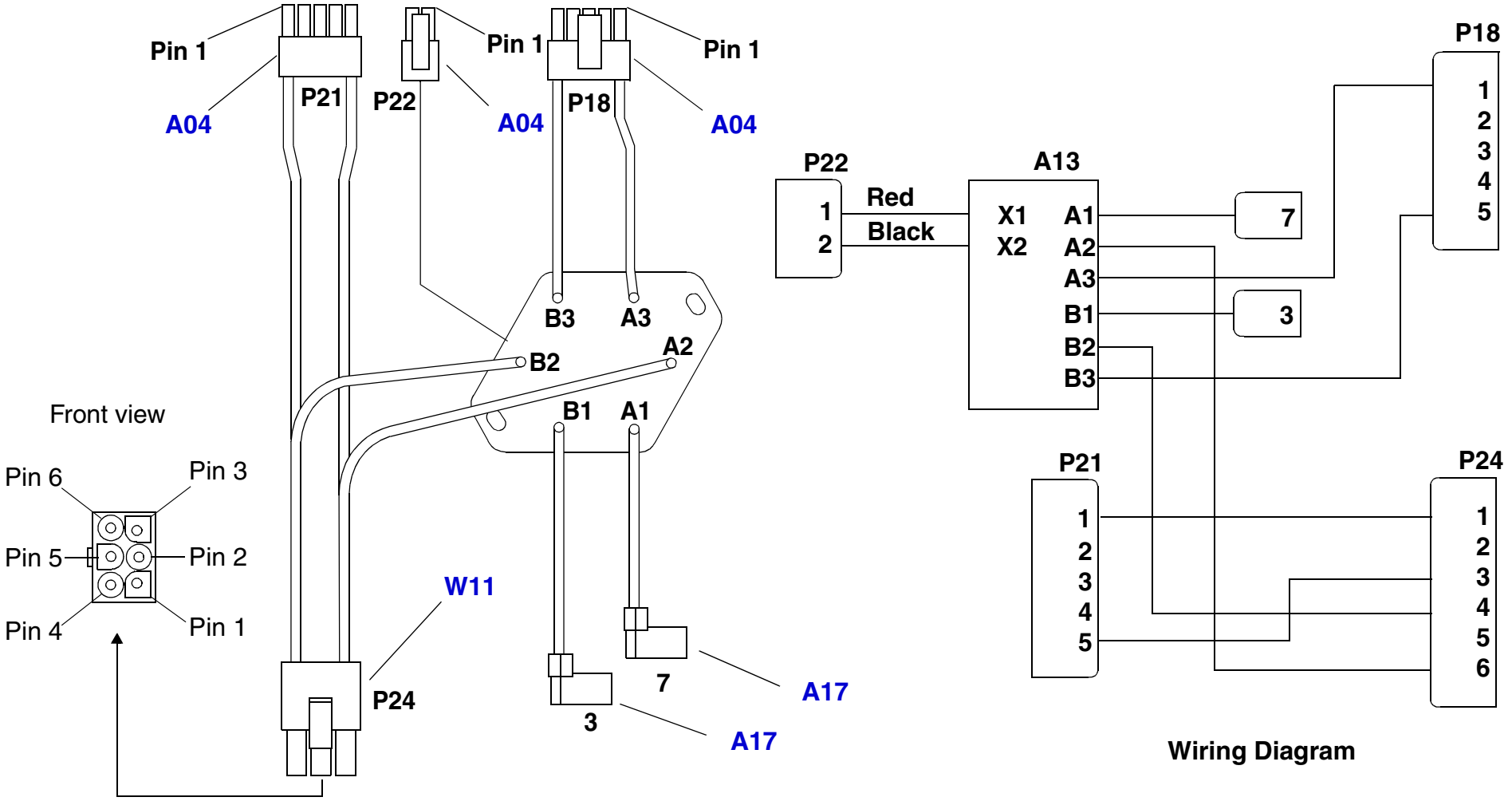
W16

View 50 mm printer parts

View 100 mm printer parts

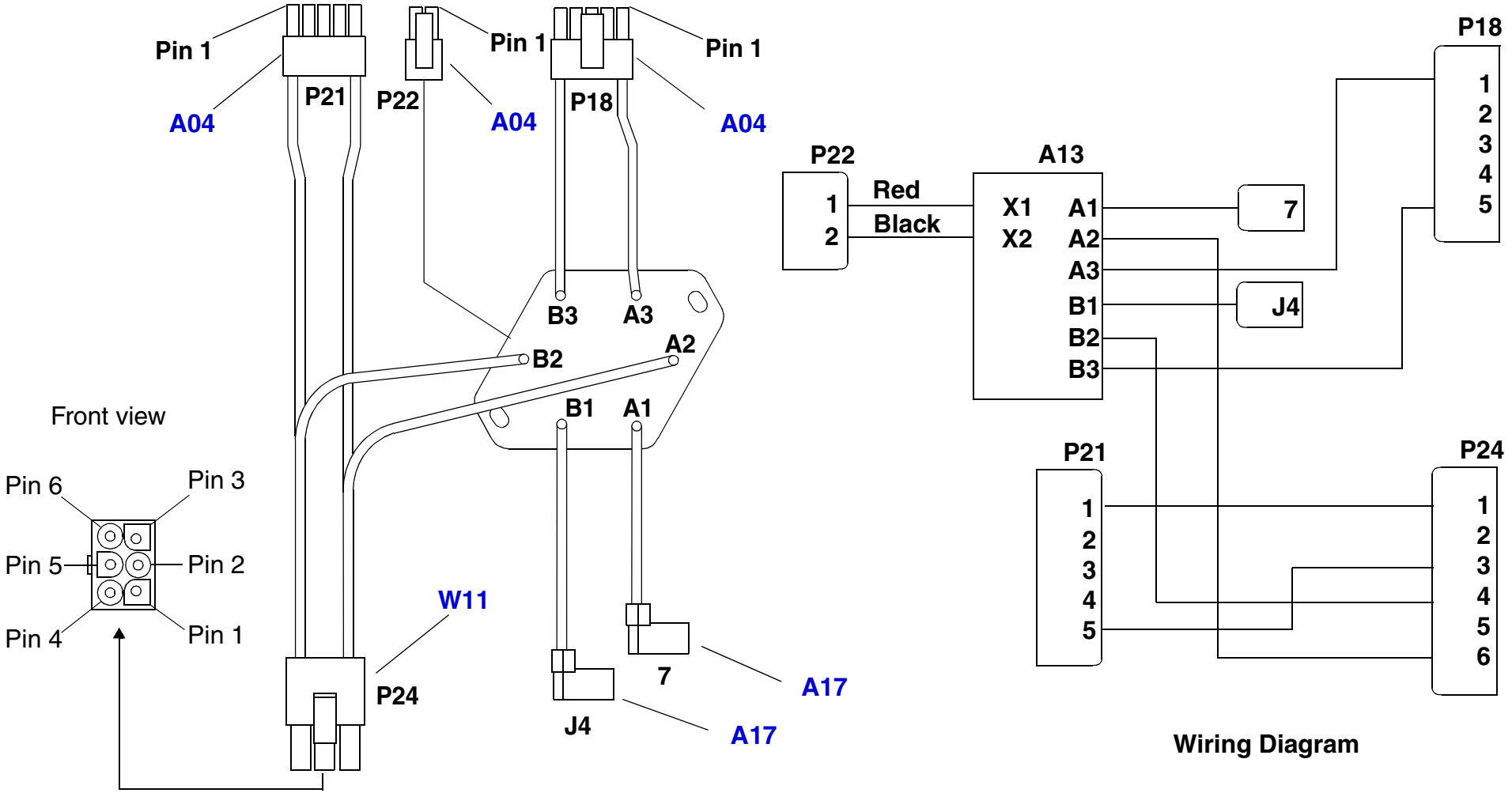
780

A13 Transfer Relay Assembly, PN 3006219-01—Edmark Devices



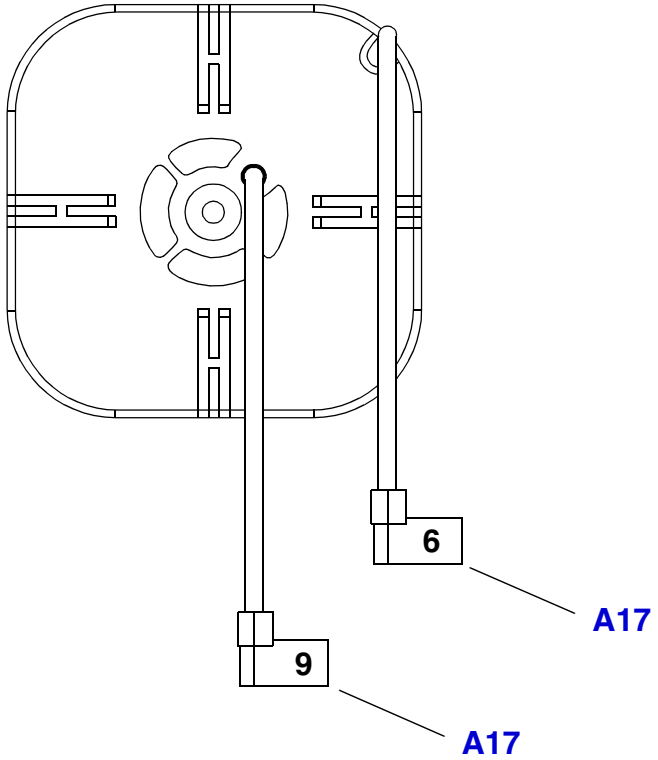
781

A13 Transfer Relay Assembly, PN 3006219-01—Biphasic Devices



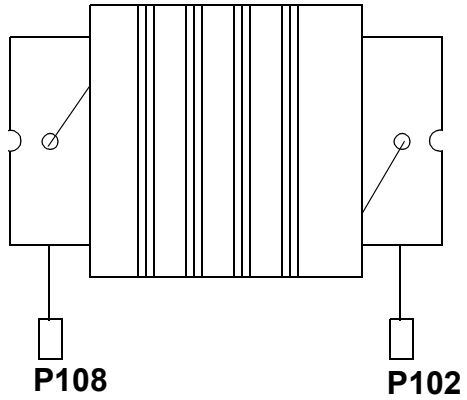
782

A14 Waveshaping Inductor, PN 3006221-01—Edmark Devices

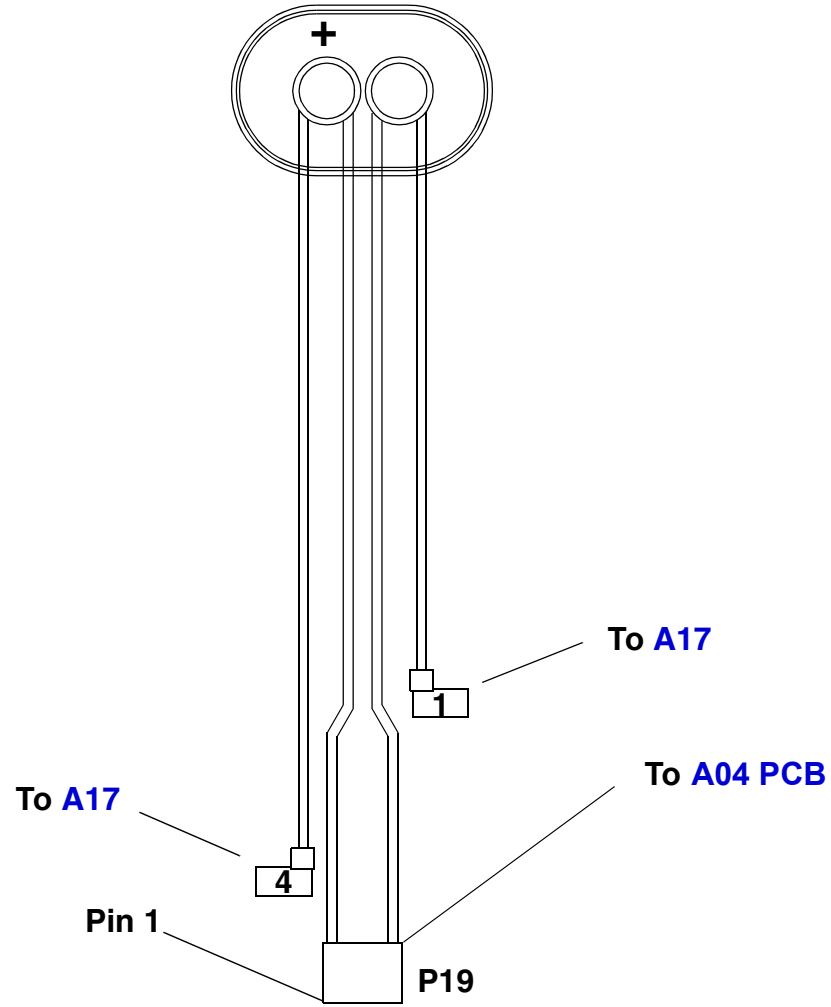


783

A14 Inductive Resistor, PN 3010212-02—Biphasic Devices

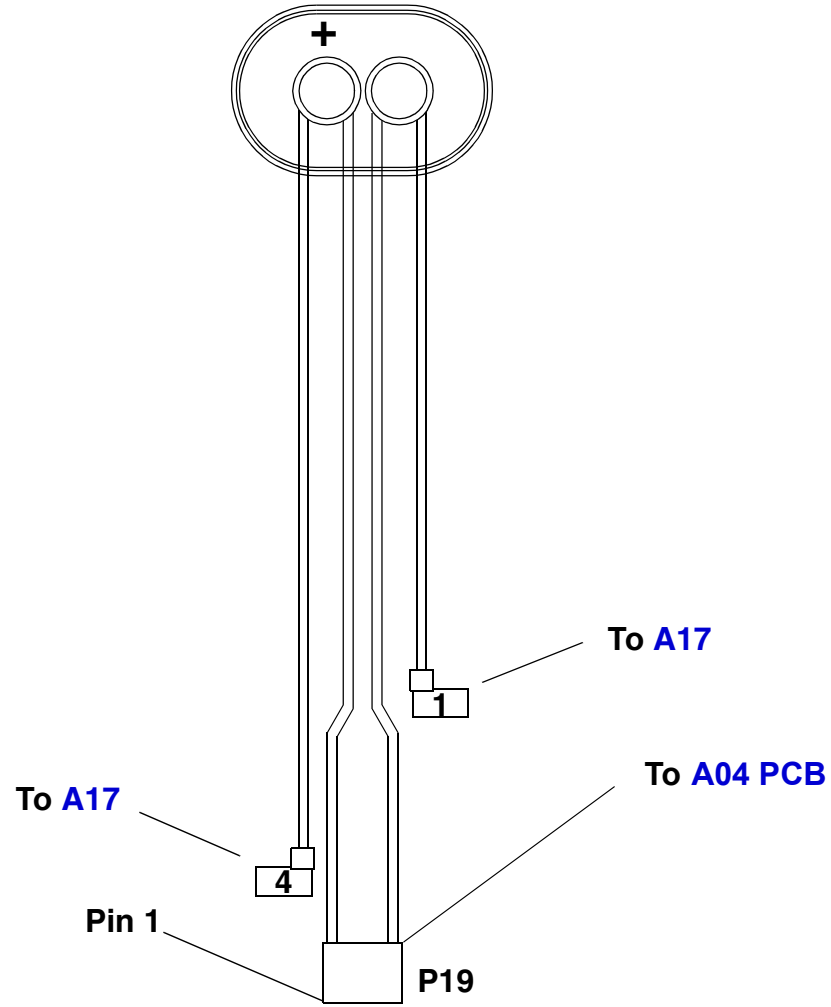


A15 Energy Storage Capacitor, PN 3006220-01—Edmark Devices



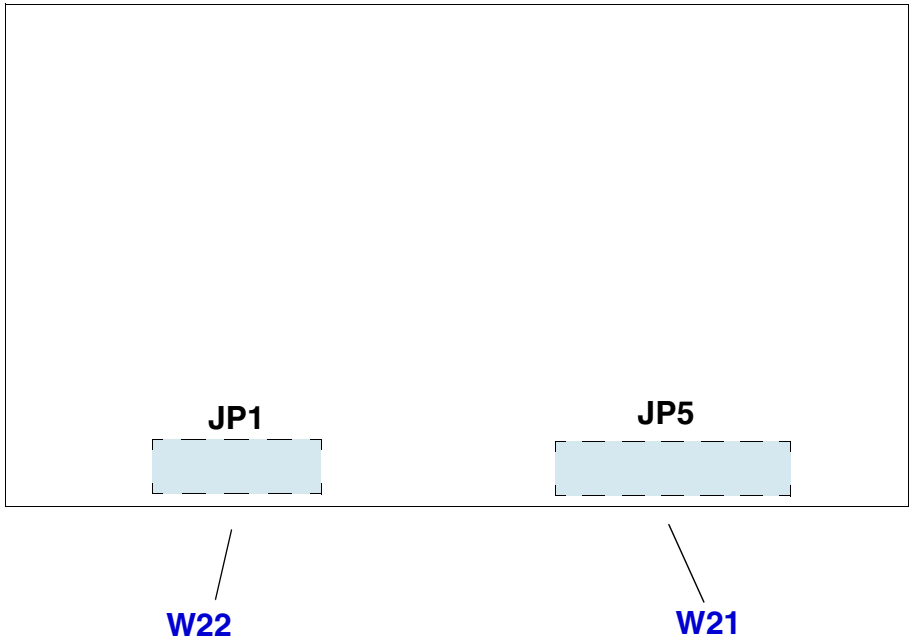
785

A15 Energy Storage Capacitor, PN 3008164-001—Biphasic Devices

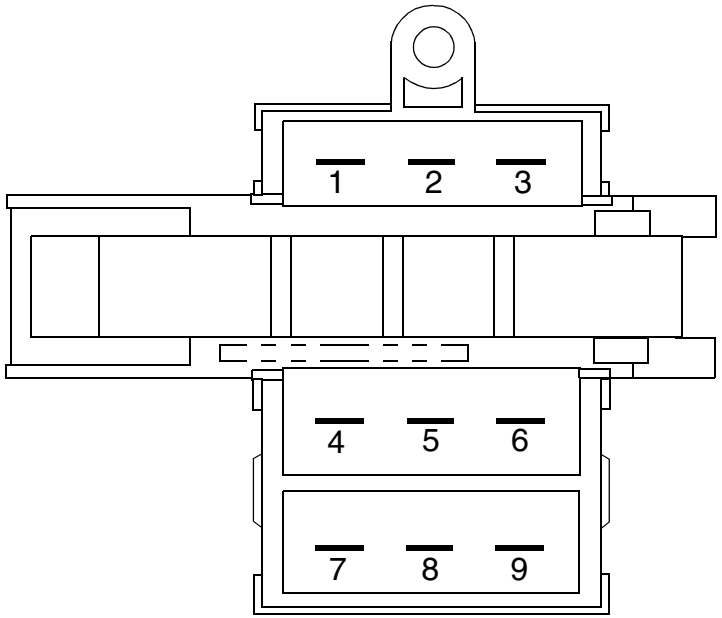


786

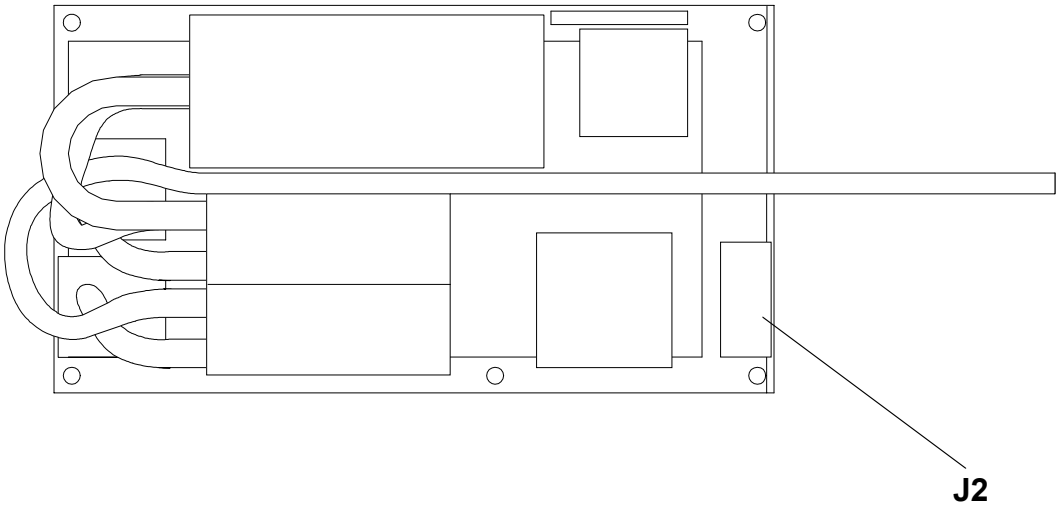
A16 SpO2 Module, PN 3008538-000



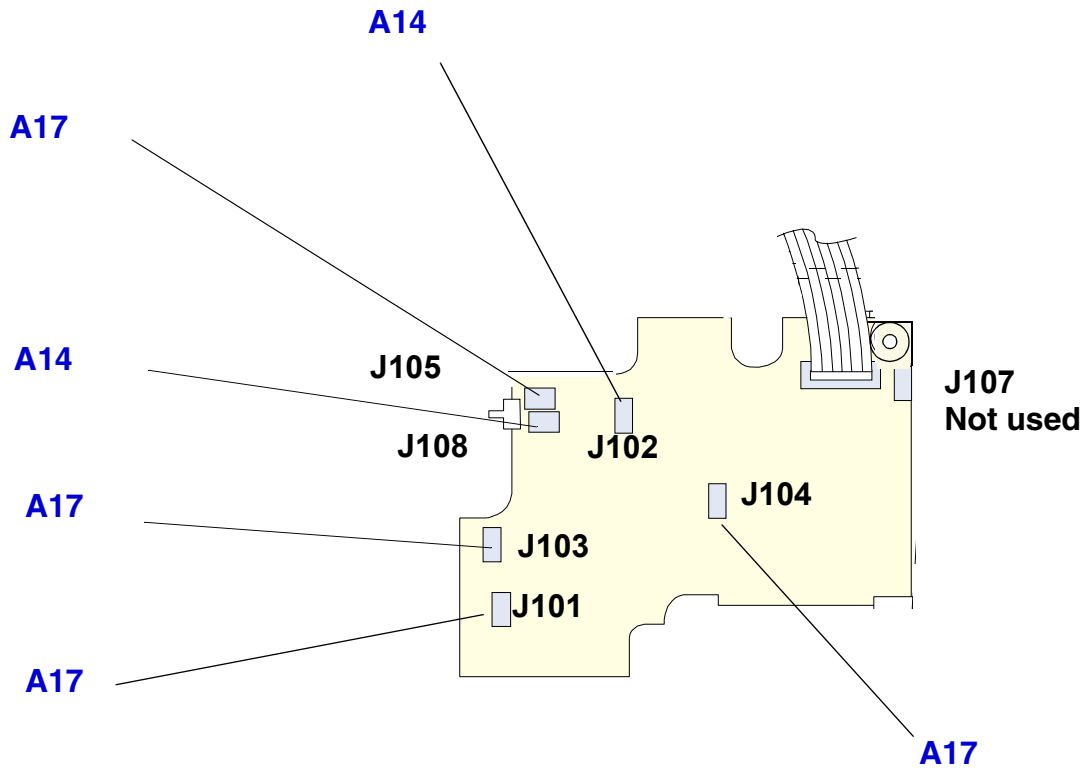
A17 Interconnect Bracket, PN 3008897-01



A21 NIBP PCB Module, PN 3008943-000

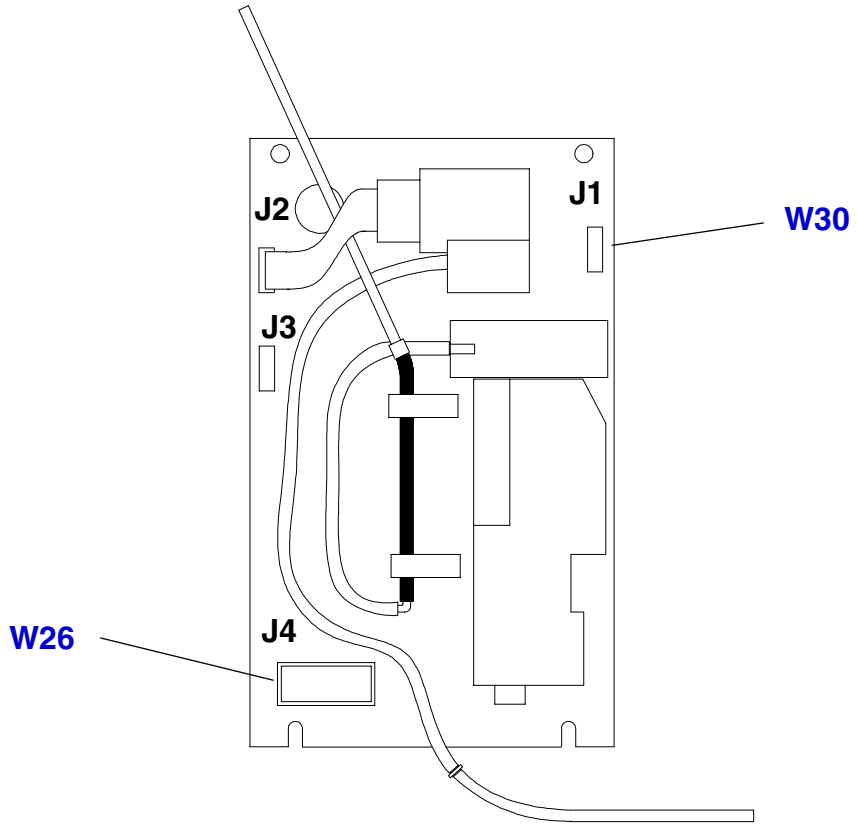


A22 Biphasic PCB, PN 3010178-009—Biphasic Devices

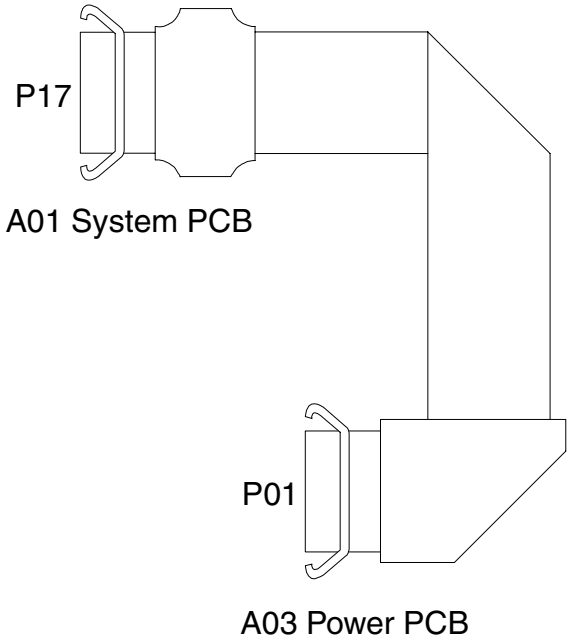


790

A23 CO2 PCB Module, PN 3012140-003

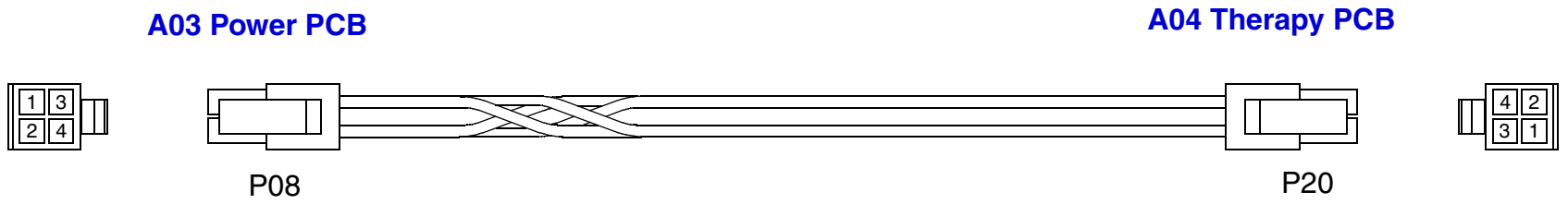


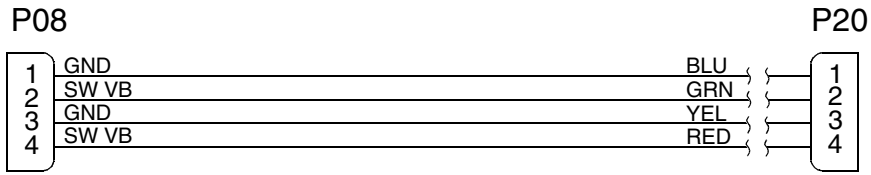
W01 Power PCB/System PCB Cable, PN 3009677-05



P1		P17
1	GND	1
2	PWR SW*	2
3	PWR MON	3
4	CHG LED	4
5	PWR LED	5
6	GND	6
7	PWR FAIL*	7
8	PWR TX	8
9	PWR RX	9
10	PS FAIL*	10
11	SYS TX	11
12	SYS RTS	12
13	SYS RX	13
14	SYS CTS	14
15	SYS DTR	15
16	ANALOG ECG	16
17	GND	17
18	NIBP TX	18
19	NIBP RX	19
20	SP TX	20
21	SP RX	21
22	SP ET SYNC	22
23		23
24	GND	24
25	OEM RES*	25
26	ET TX	26
27	ET RX	27
28	NIBP ON	28
29	OEM VPP ENA	29
30	GND	30
31		31
32		32
33		33
34		34

W02 Power PCB/Therapy PCB Cable, PN 3009726-05

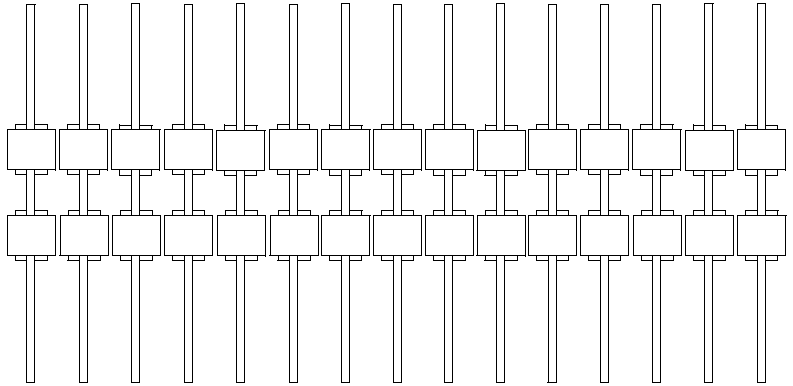




793

W03 System PCB/Therapy PCB Connector, PN 3009878-002

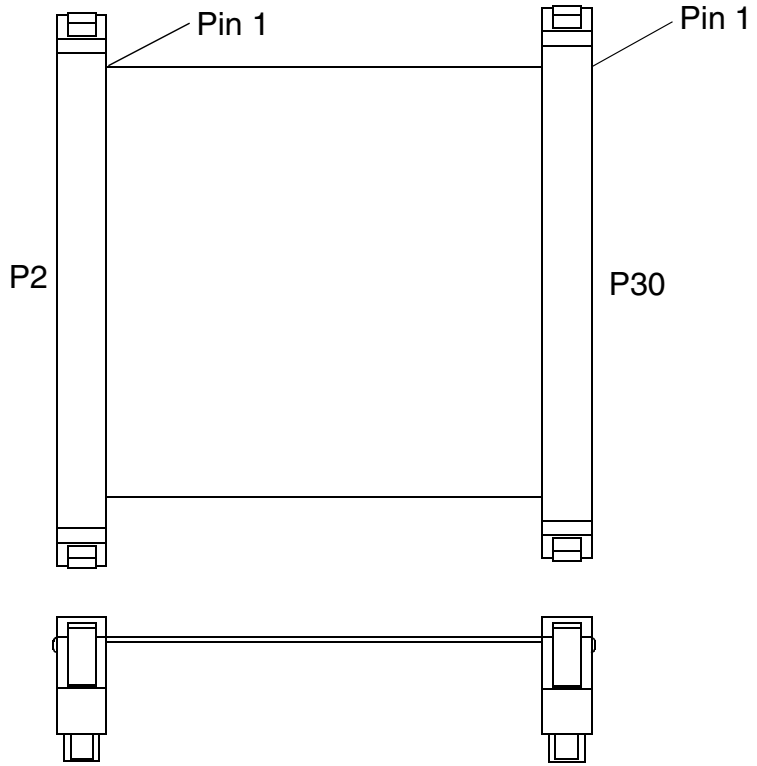
A01 System PCB



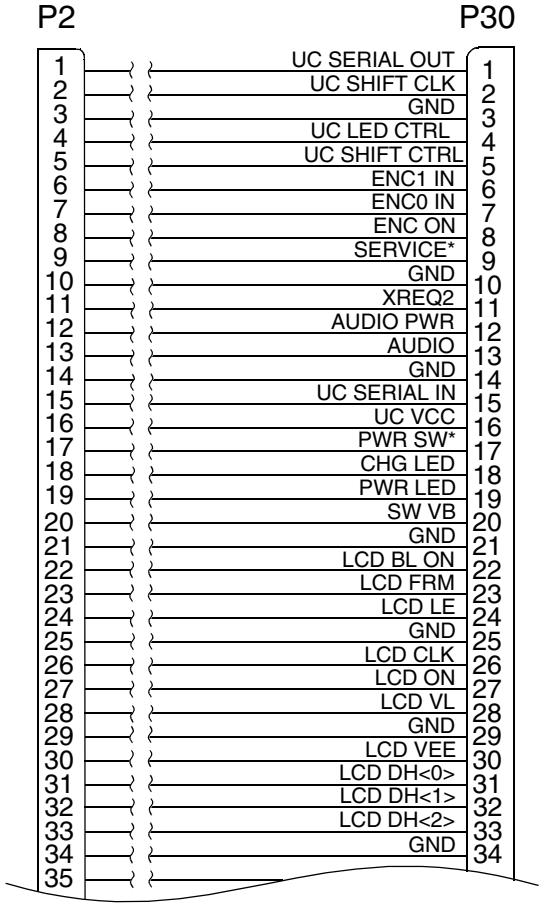
A04 Therapy PCB

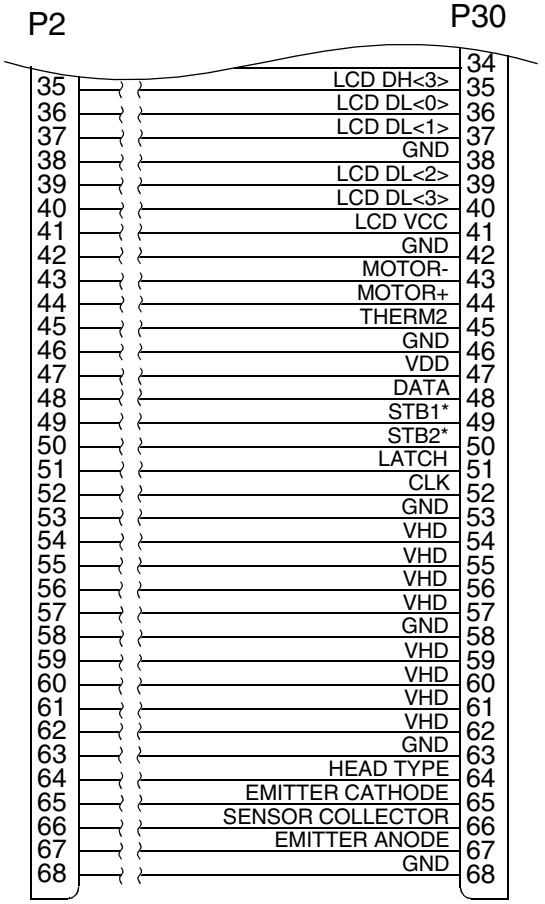
W04 System PCB/Interface PCB Cable, PN 3009677-01

A01 System PCB



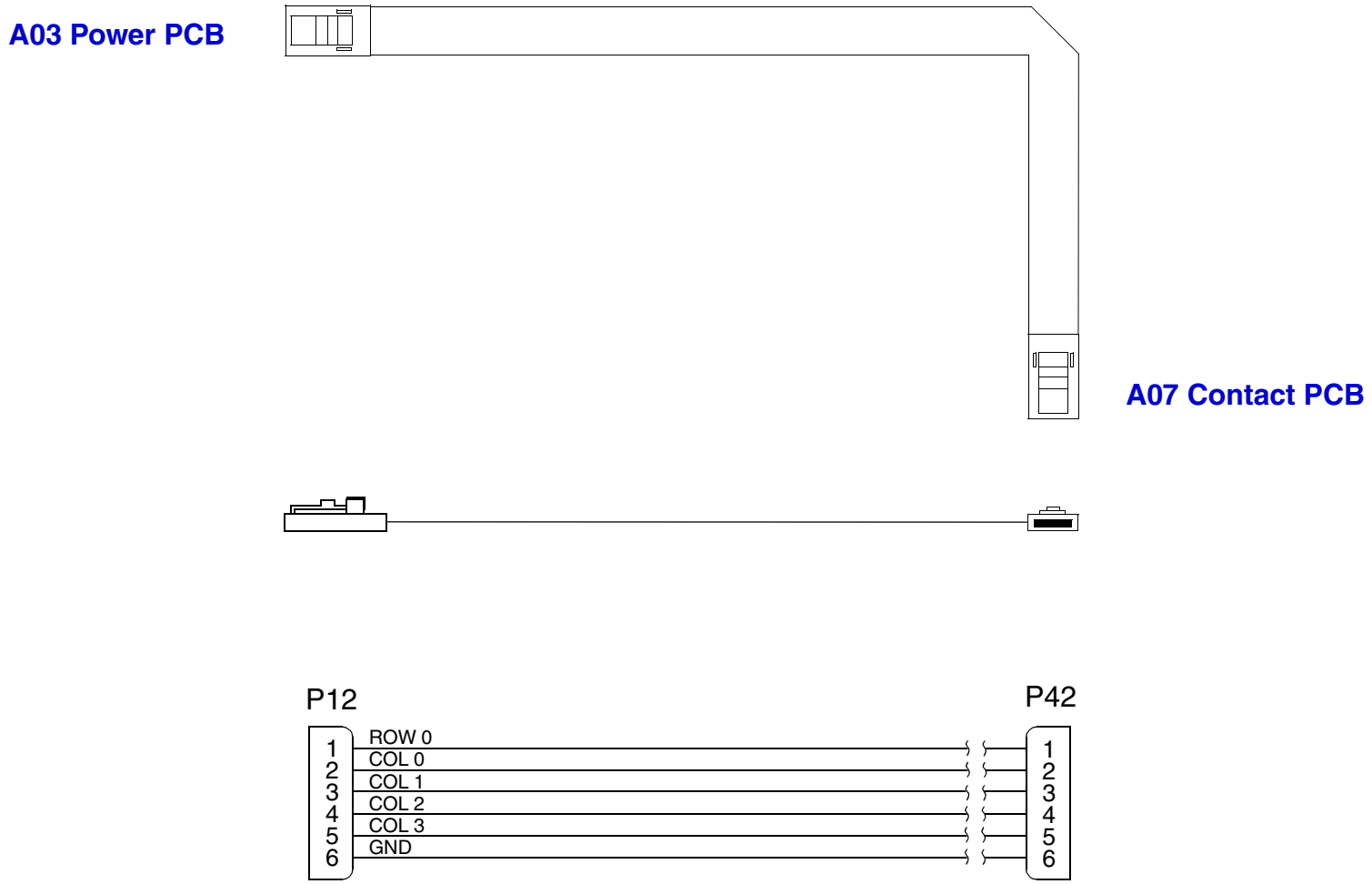
A05 Interface PCB





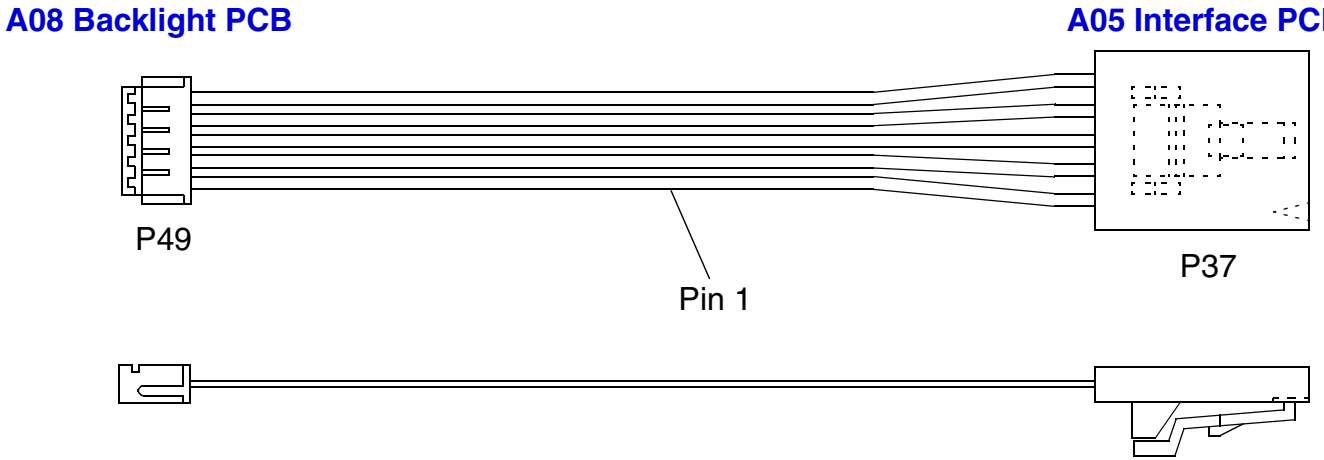
795

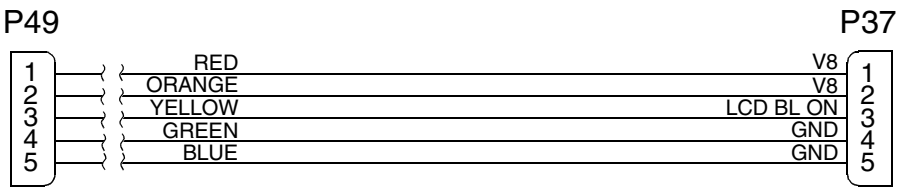
W05 Power PCB/Contact PCB Cable, PN 3009678-03



796

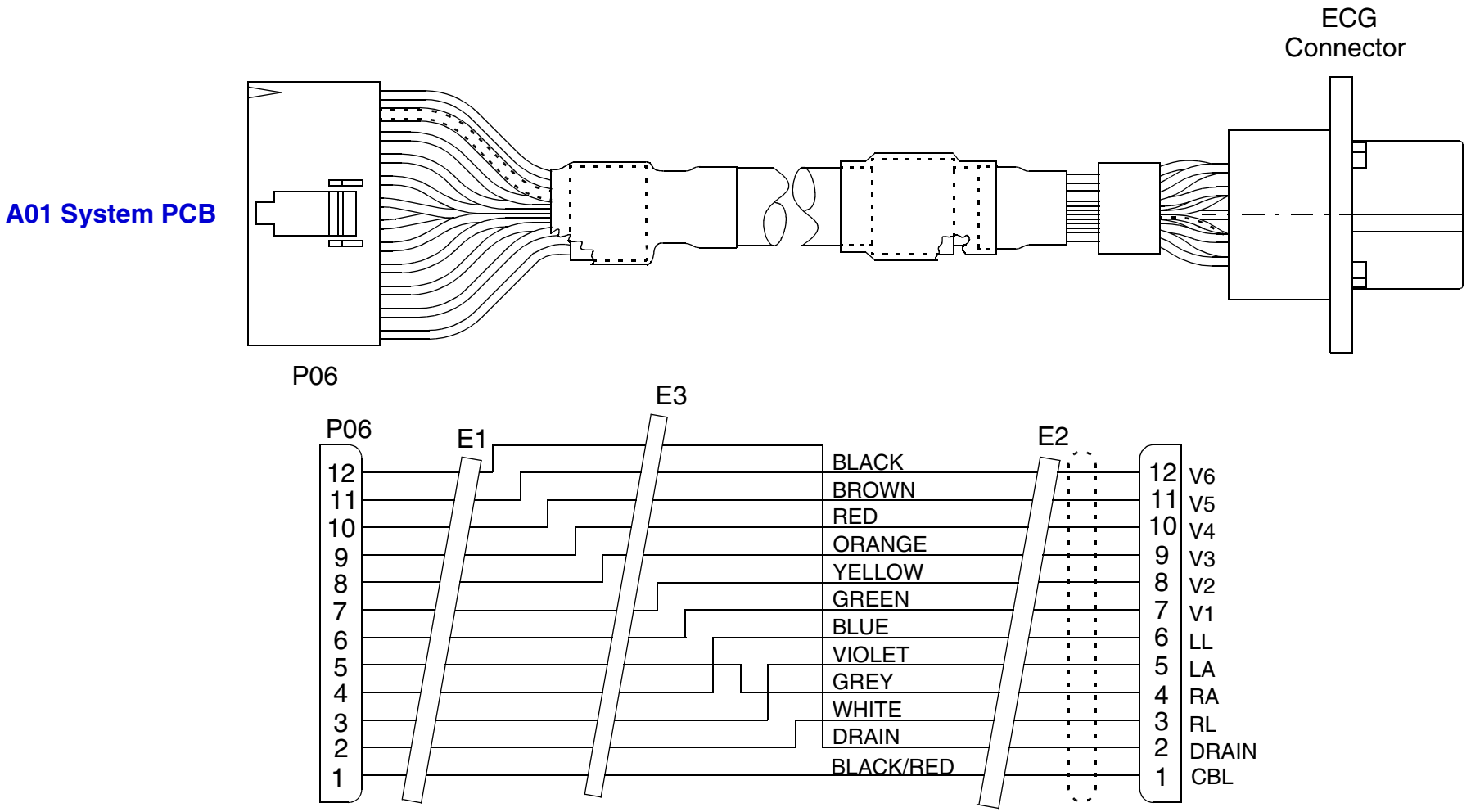
W06 Backlight PCB/Interface PCB LCD Cable, PN 3009702-000—LCD Devices





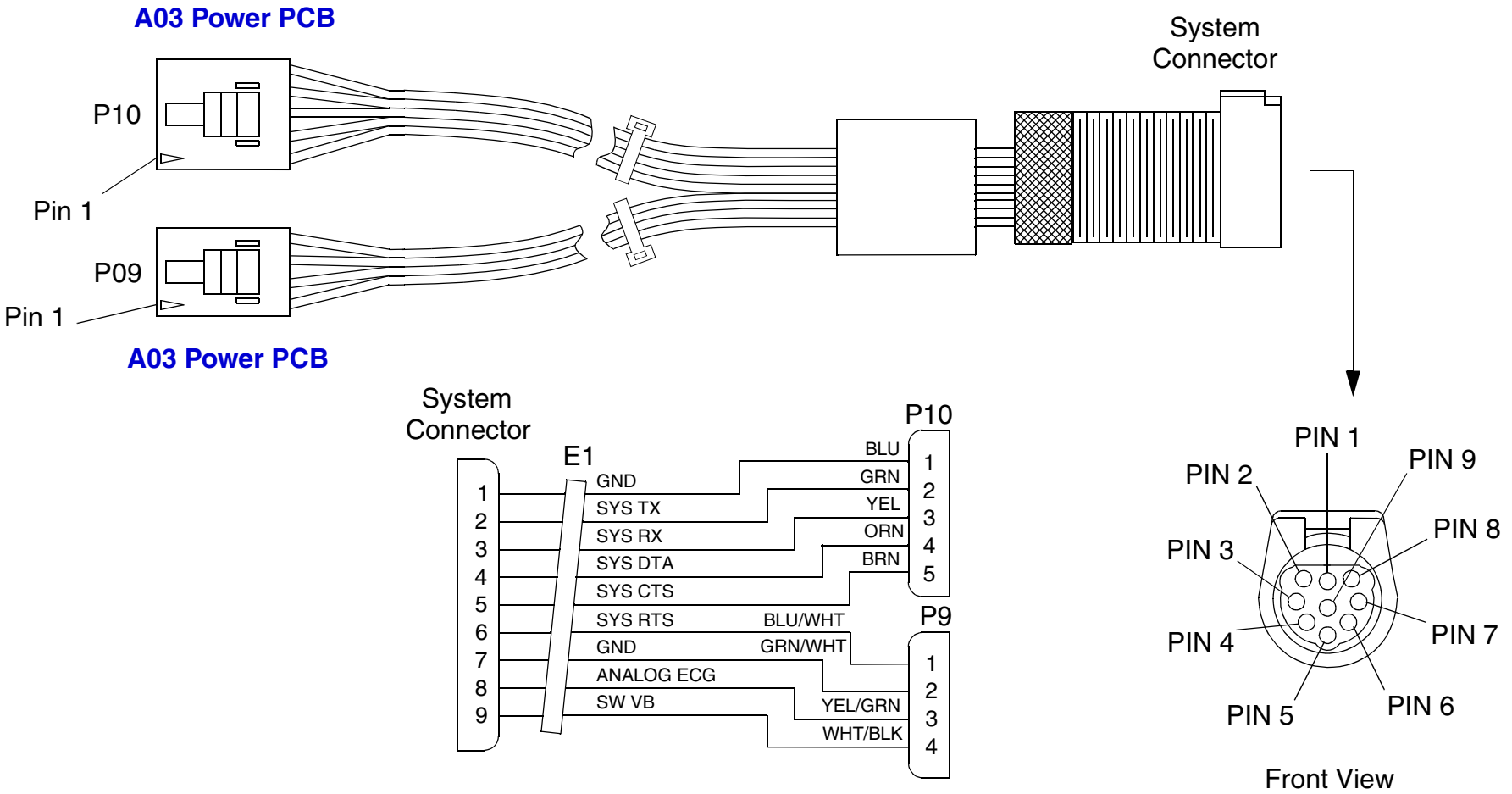
797

W07 ECG Connector Cable, PN 3007991-02



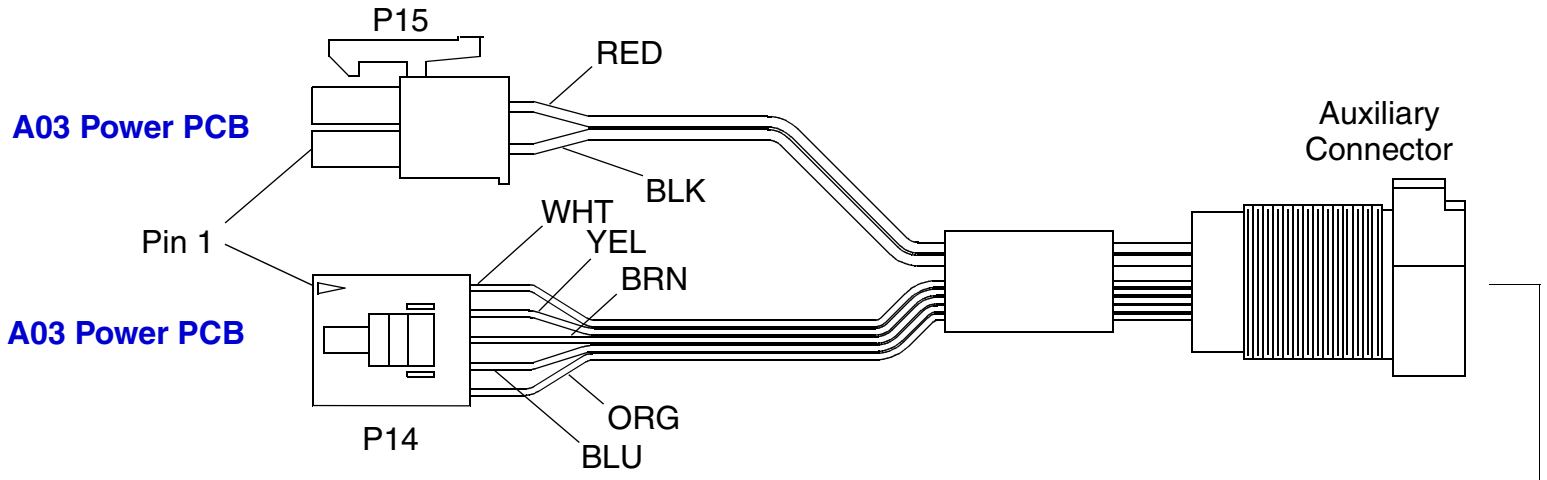
798

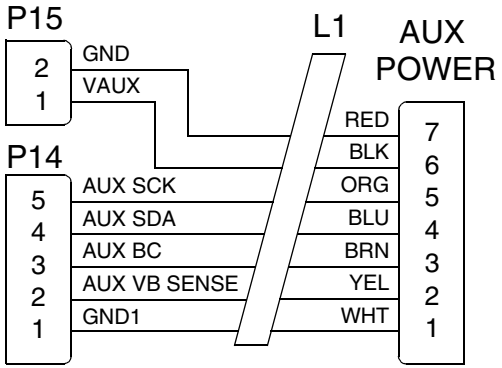
W08 System Connector Cable, PN 3009652-01

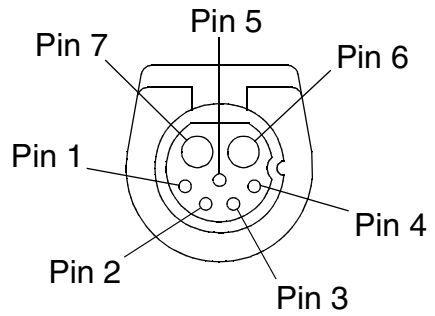


799

W09 Auxiliary Connector Cable, PN 3008392-00



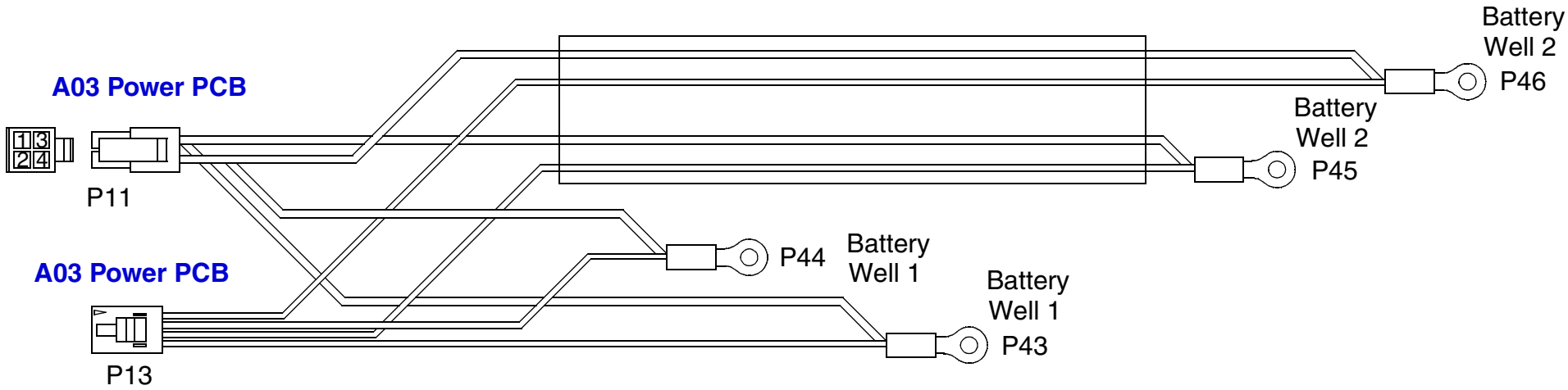


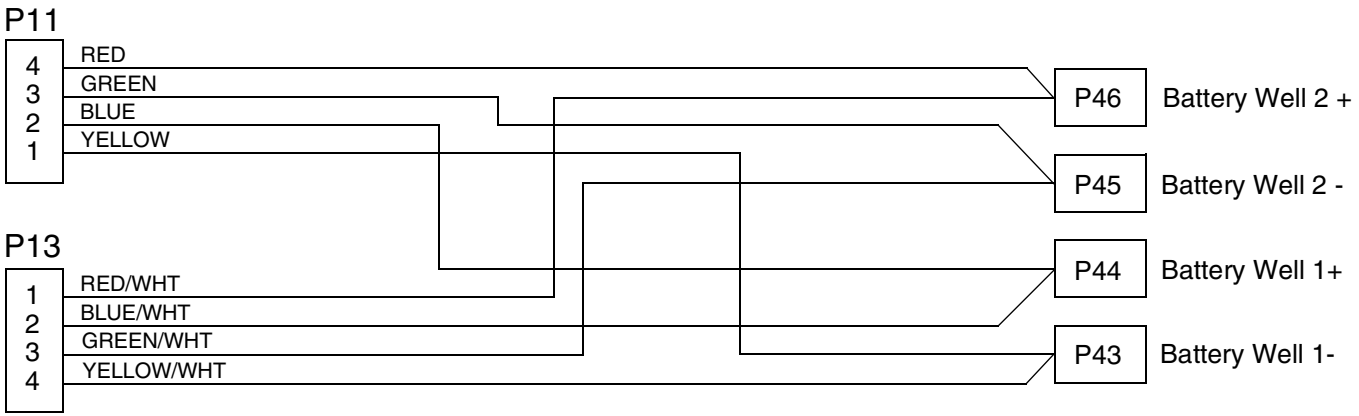


Front View

800

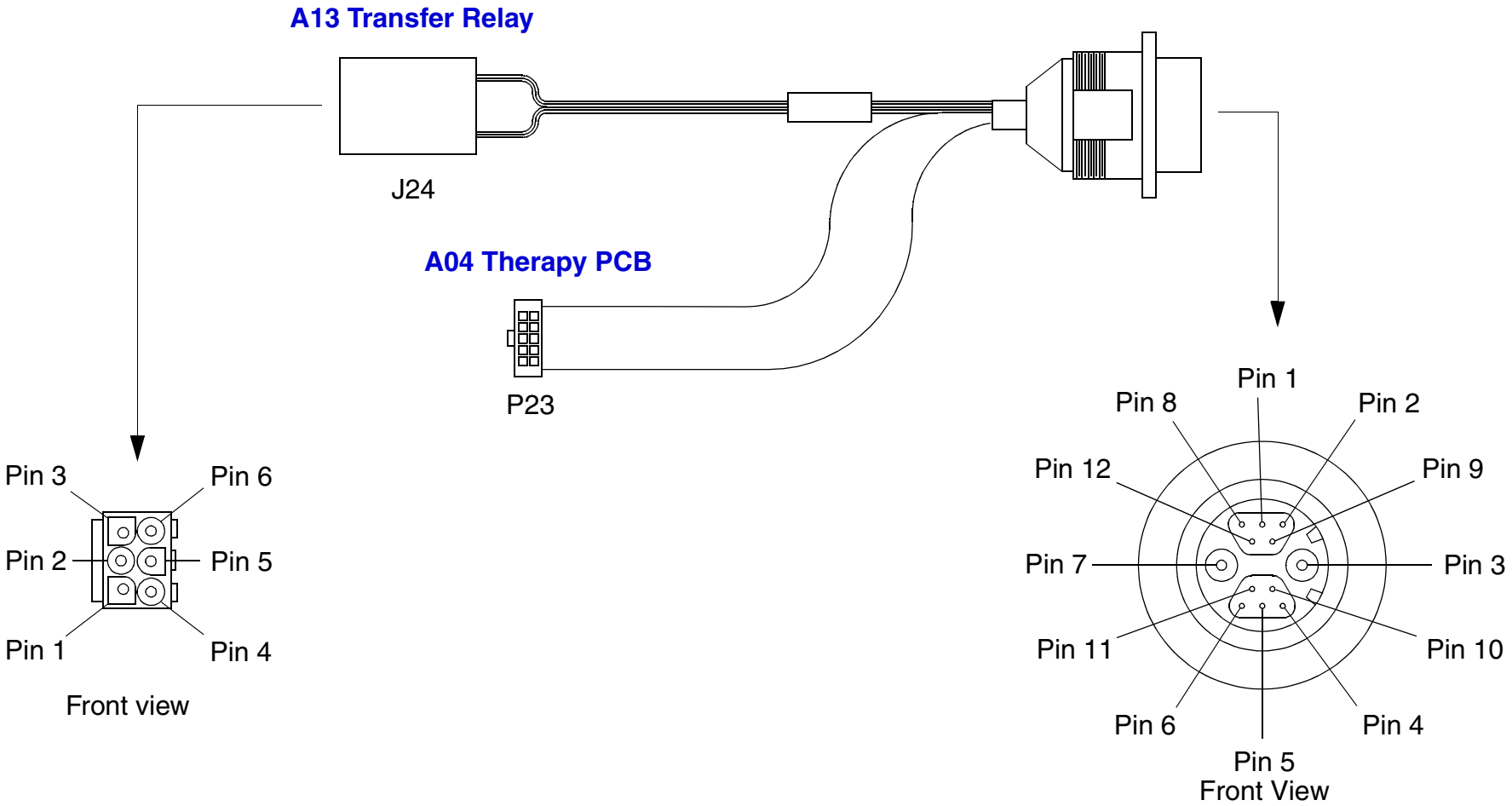
W10 Battery Pins/Power PCB Cable, PN 3009726-08





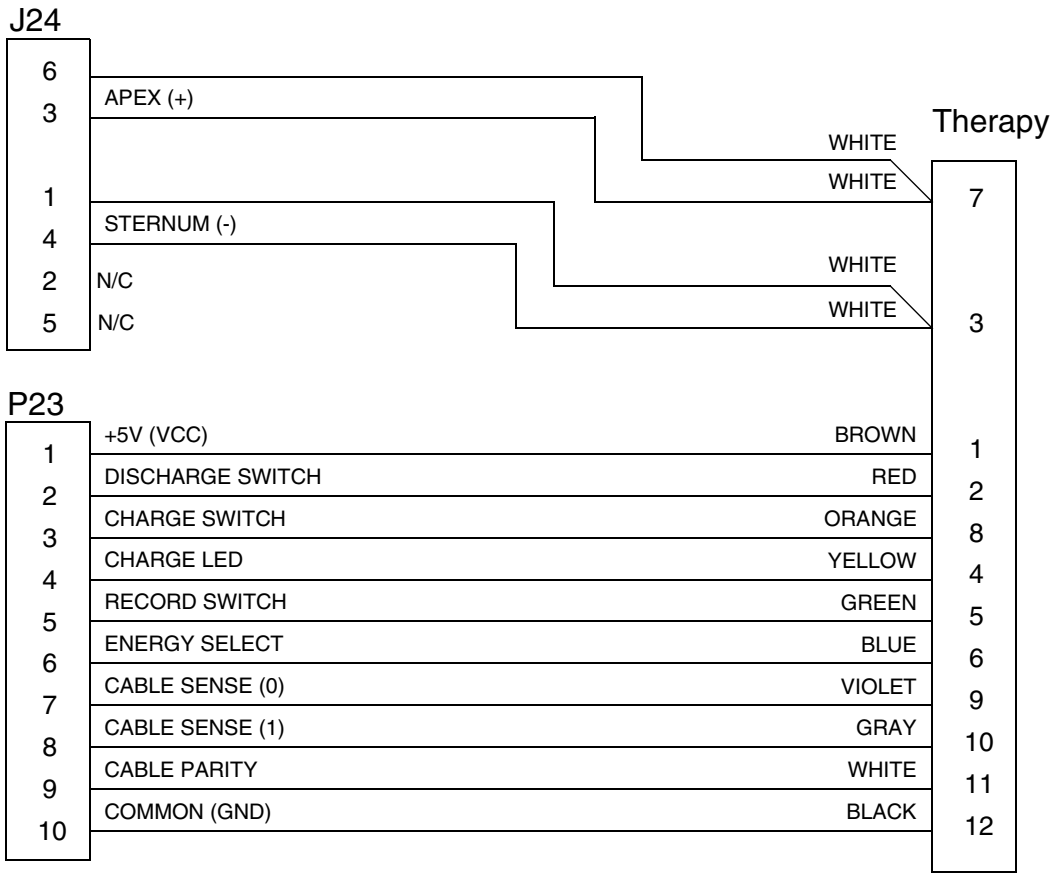
801

W11 Therapy Connector Cable, PN 3006216-03



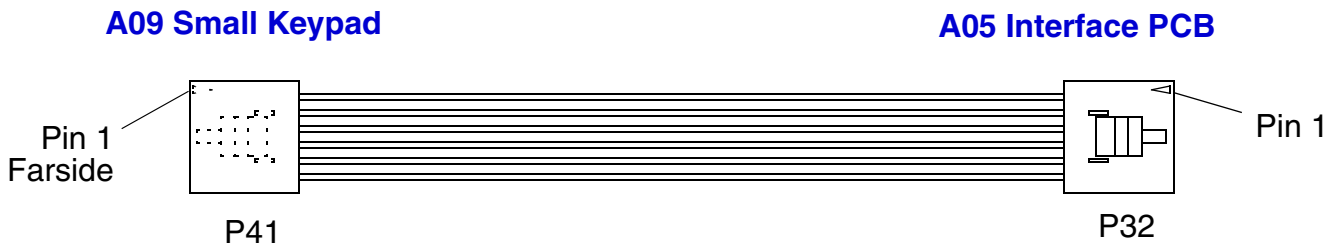
802

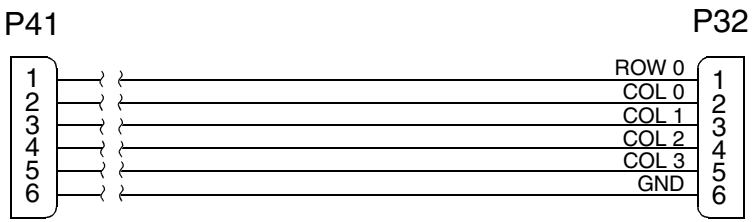
W11 Therapy Connector Cable



803

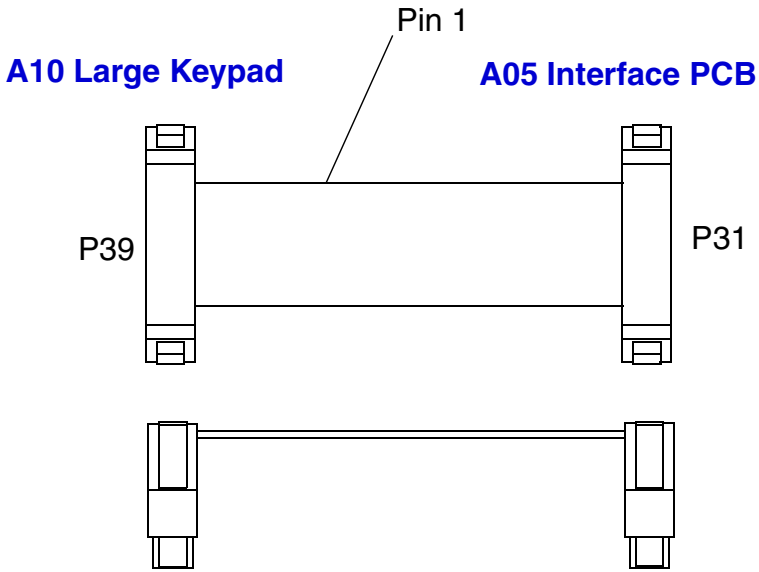
W12 Small Keypad/Interface PCB Cable, PN 3009726-04





804

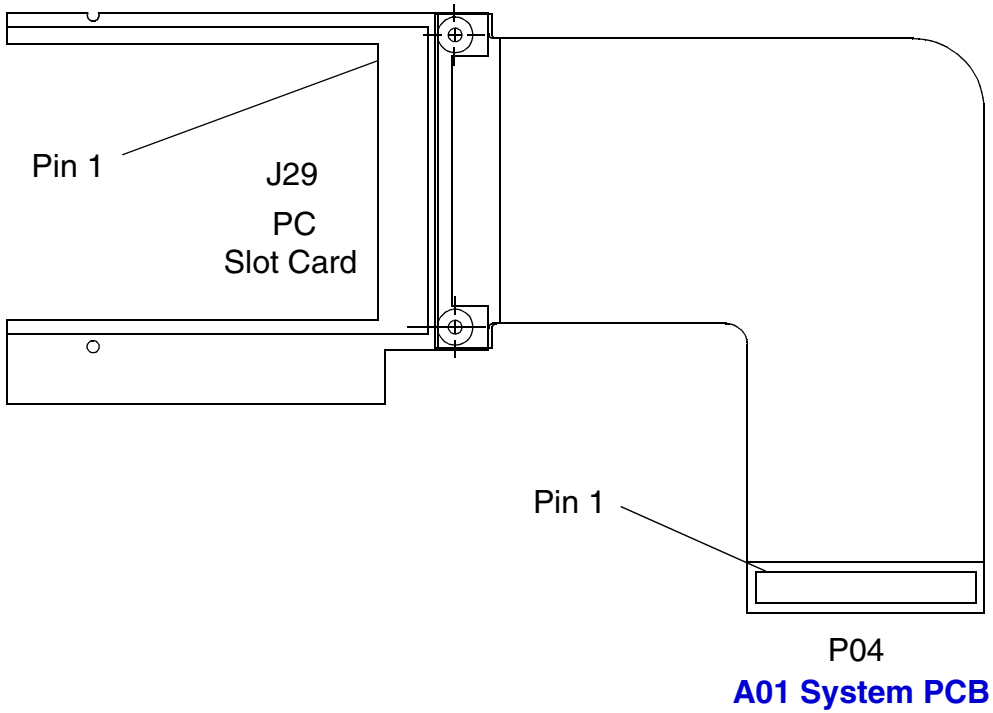
W13 Large Keypad/Interface PCB Cable, PN 3009677-03



P39		P31
1	GND	1
2	SHOCK LED	2
3	SYNC LED	3
4	PACING LED	4
5	NIBP LED	5
6	ALARMS LED	6
7	TRIM LED	7
8	ANALYZE LED	8
9	ADVISORY LED	9
10	ROW 1	10
11	ROW 2	11
12	ROW 3	12
13	ROW 4	13
14	ROW 5	14
15	COL 0	15
16	COL 1	16
17	COL 2	17
18	COL 3	18
19	COL 4	19
20	VCC	20
21	CHG LED	21
22	PWR LED	22
23	PWR SW*	23
24	SERVICE LED	24
25	XREQ2	25
26	GND	26

805

W14 System PCB/PC Card Slot Cable, PN 3009276-02



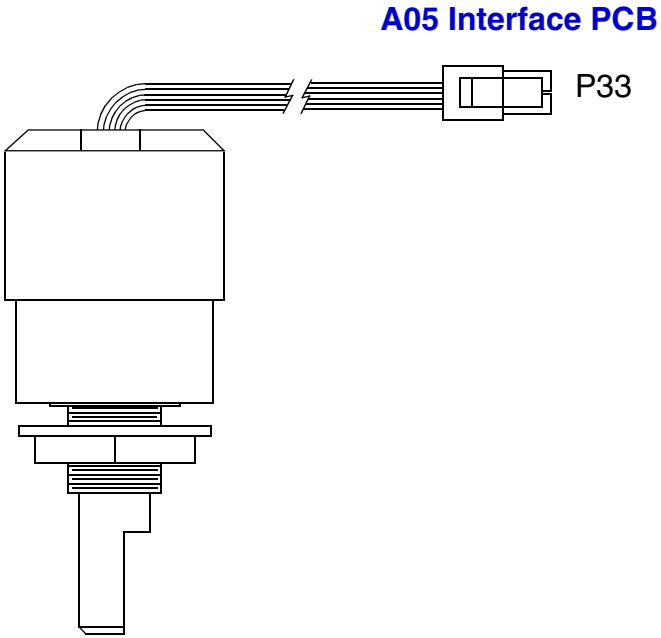
806

W14 System PCB/PC Card Slot Cable

J29	TYPE	P04	J29	TYPE	P04
-	-	1	35	GND	36
1	GND	2	36	DET	37
2	SIG	3	37	SIG	38
3	SIG	4	38	SIG	39
4	SIG	5	39	SIG	40
5	SIG	6	40	SIG	41
6	SIG	7	41	SIG	42
7	SIG	8	42	SIG	43
8	SIG	9	43	SIG	44
9	SIG	10	44	SIG	45
10	SIG	11	45	SIG	46
11	SIG	12	46	SIG	47
12	SIG	13	47	SIG	48
13	SIG	14	48	SIG	49
14	SIG	15	49	SIG	50
15	SIG	16	50	SIG	51
16	SIG	17	51	SIG	52
17	SIG	18	52	SIG	53
18	SIG	19	53	SIG	54
19	SIG	20	54	SIG	55
20	SIG	21	55	SIG	56
21	SIG	22	56	SIG	57
22	SIG	23	57	SIG	58
23	SIG	24	58	SIG	59
24	SIG	25	59	SIG	60
25	SIG	26	60	SIG	61
26	SIG	27	61	SIG	62
27	SIG	28	62	SIG	63
28	SIG	29	63	SIG	64
29	SIG	30	64	SIG	65
30	SIG	31	65	SIG	66
31	SIG	32	66	SIG	67
32	SIG	33	67	DET	68
33	SIG	34	68	GND	69
34	GND	35	-	-	-

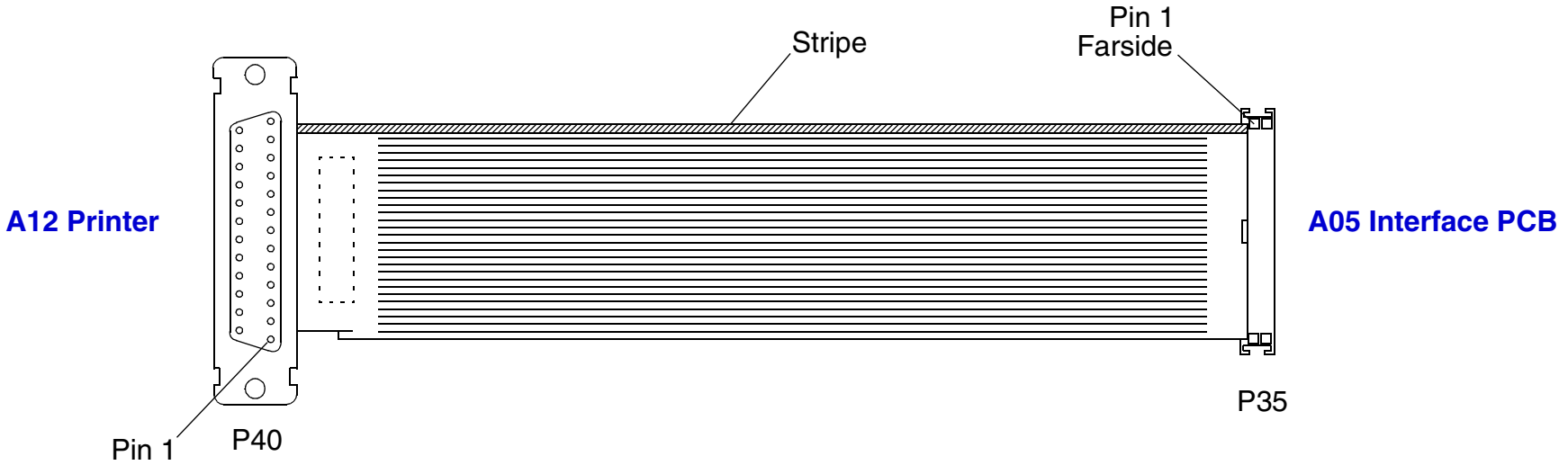
807

W15 Selector Assembly, PN 3011128-01



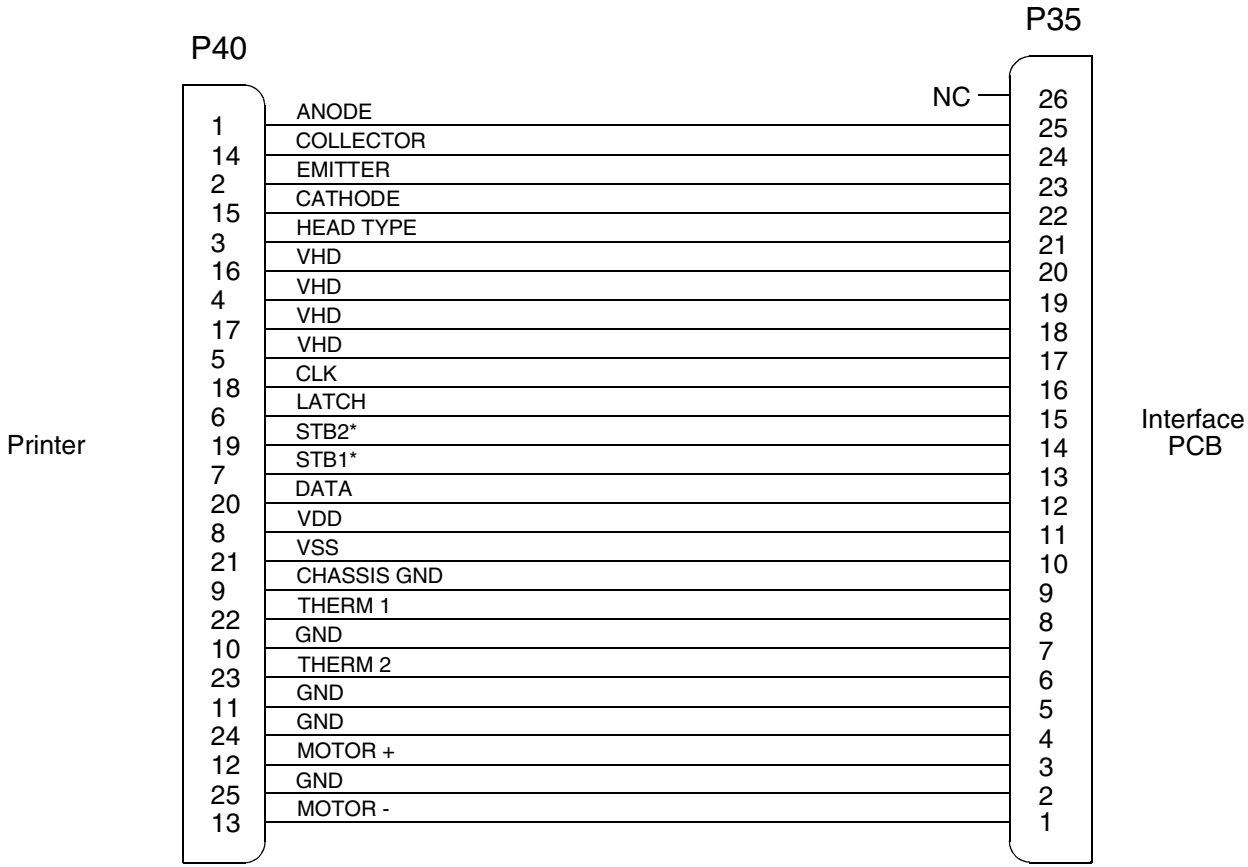
808

W16 Printer Assembly/Interface PCB Cable, PN 3009724-00



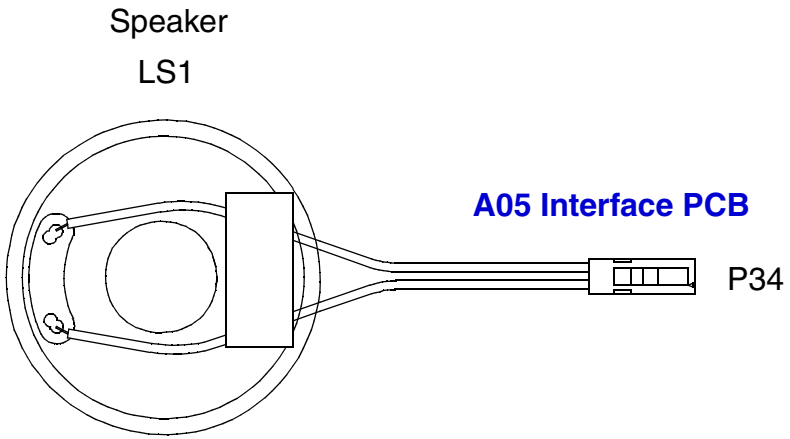
809

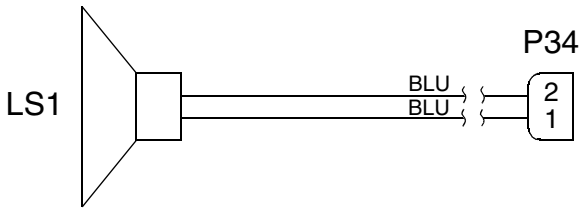
W16 Printer Assembly/Interface PCB Cable



810

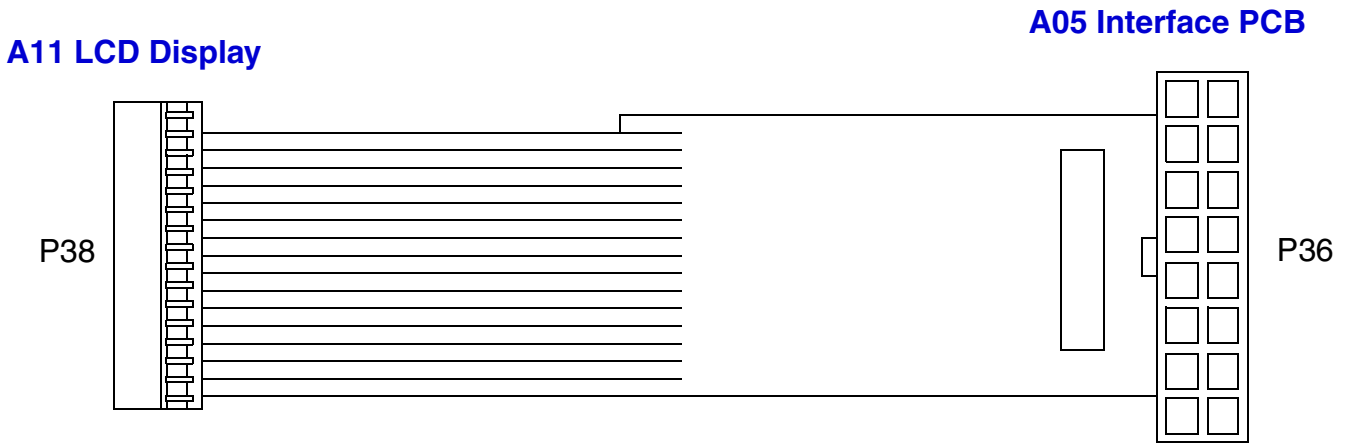
W17 Speaker Assembly, PN 3009726-03

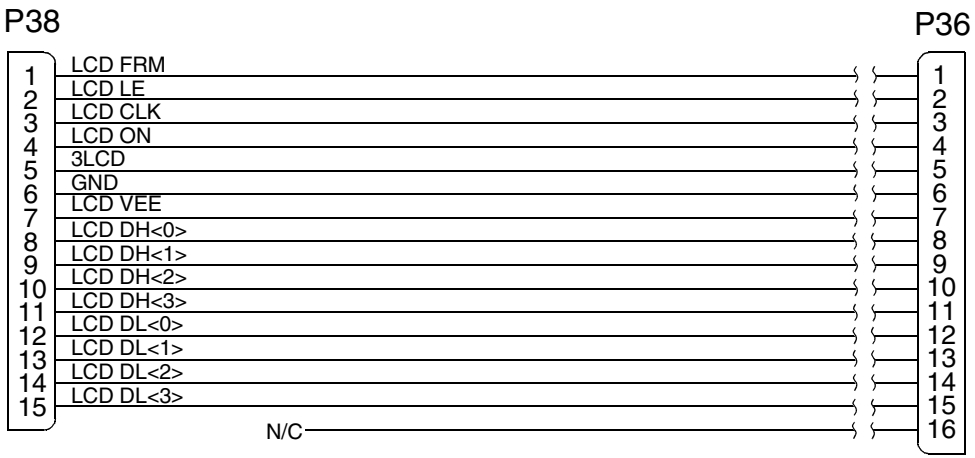




811

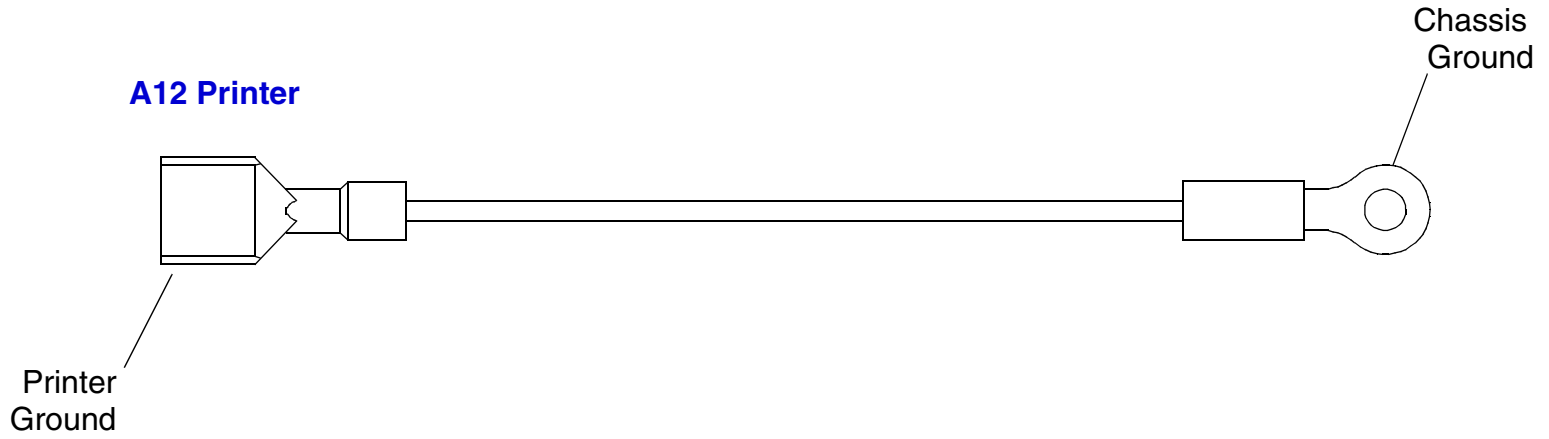
W18 LCD Assembly/Interface PCB Cable, PN 3009701-000—LCD Only



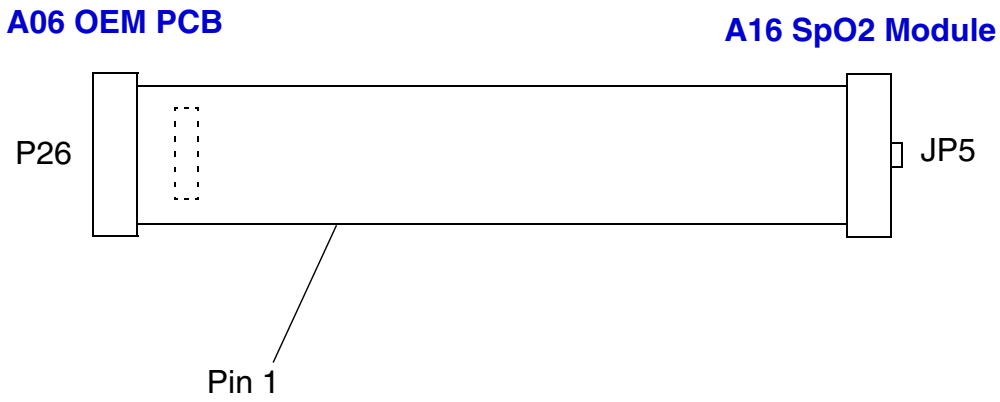


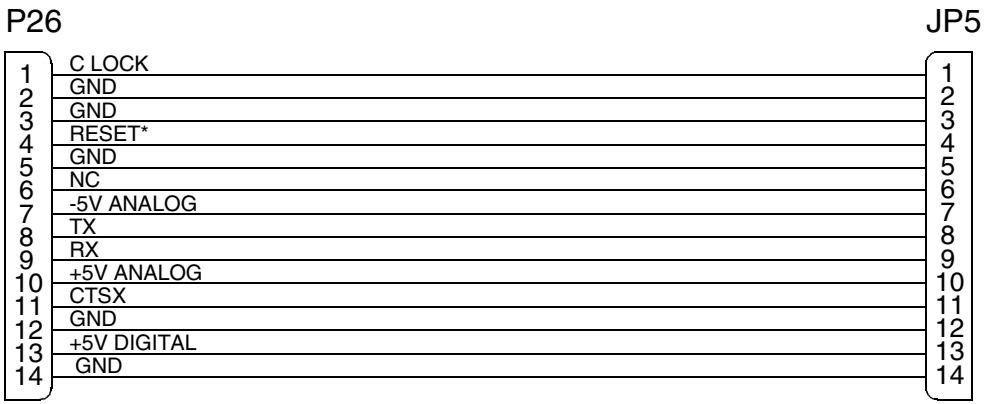
812

W19 Printer Assembly/Chassis Ground Cable, PN 3009726-01



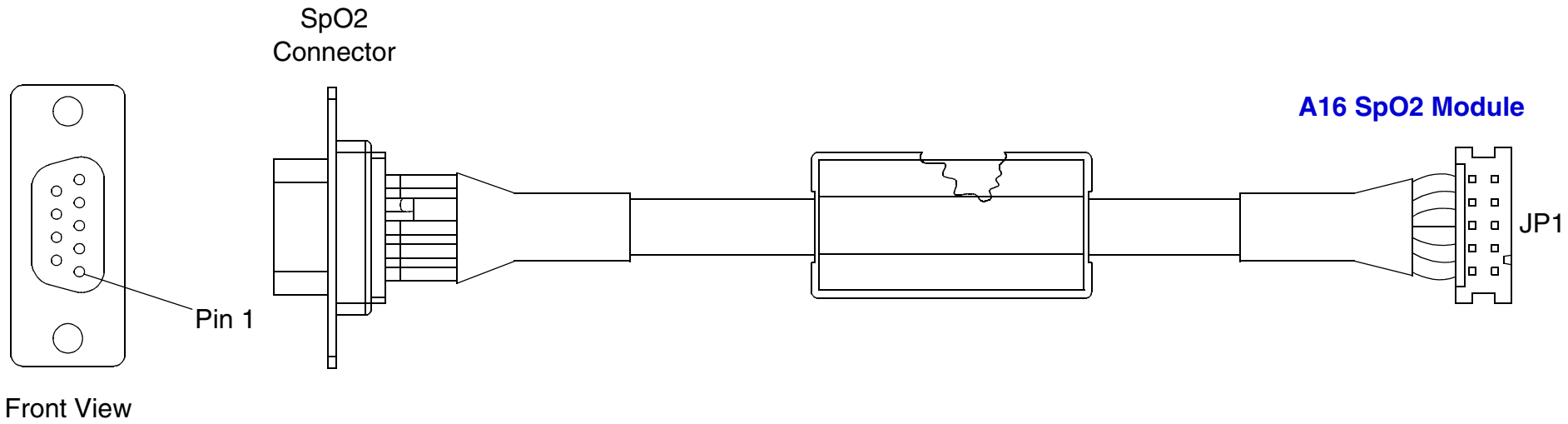
W21 OEM PCB/SpO2 Module Cable, PN 3009700-00

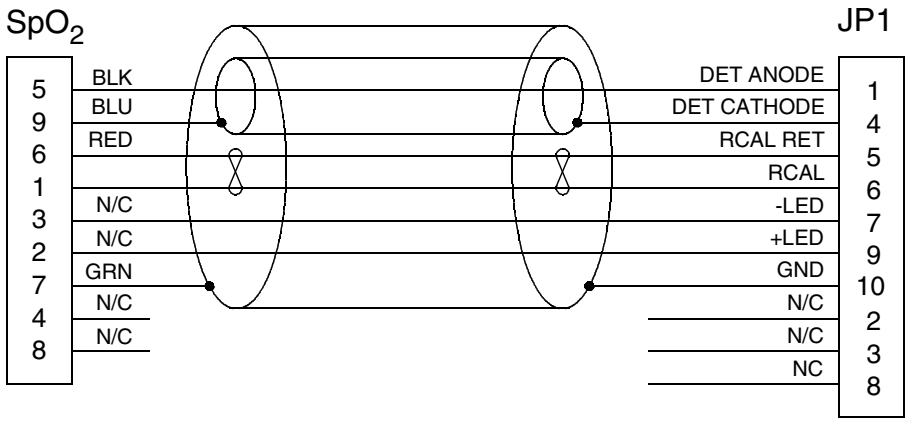




814

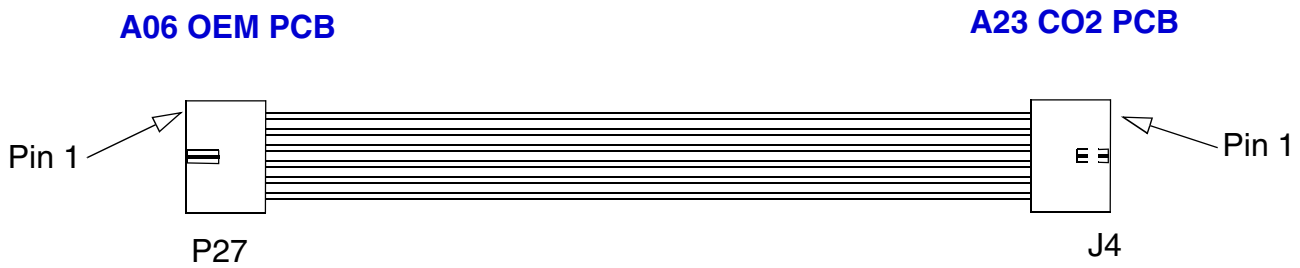
W22 SpO2 Connector Cable, PN 3007993-02

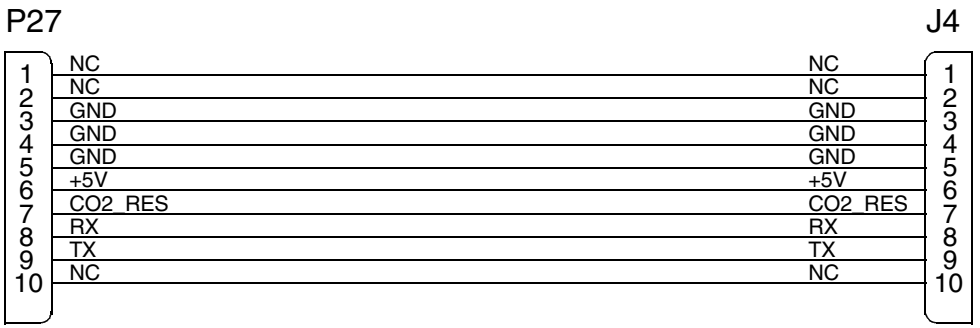




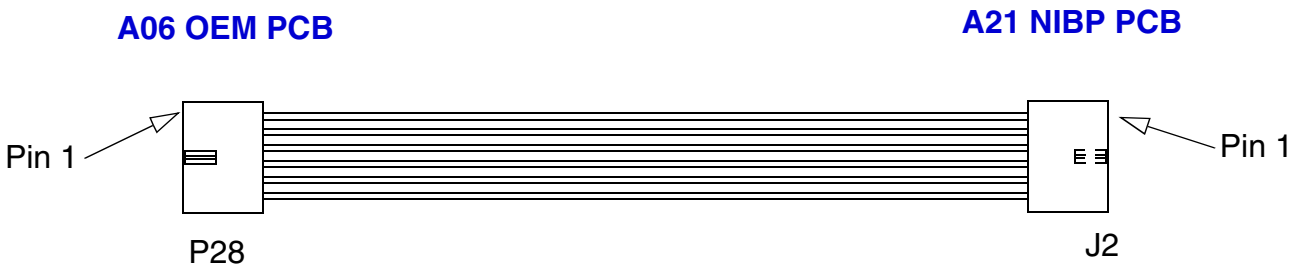
815

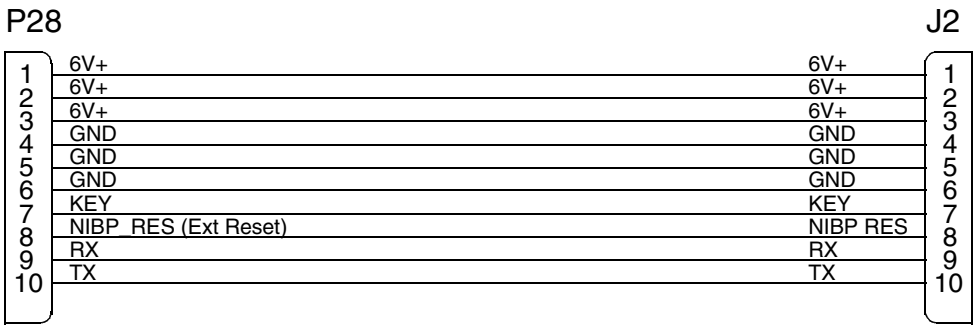
W26 OEM PCB/CO2 PCB Cable, PN 3012181-02



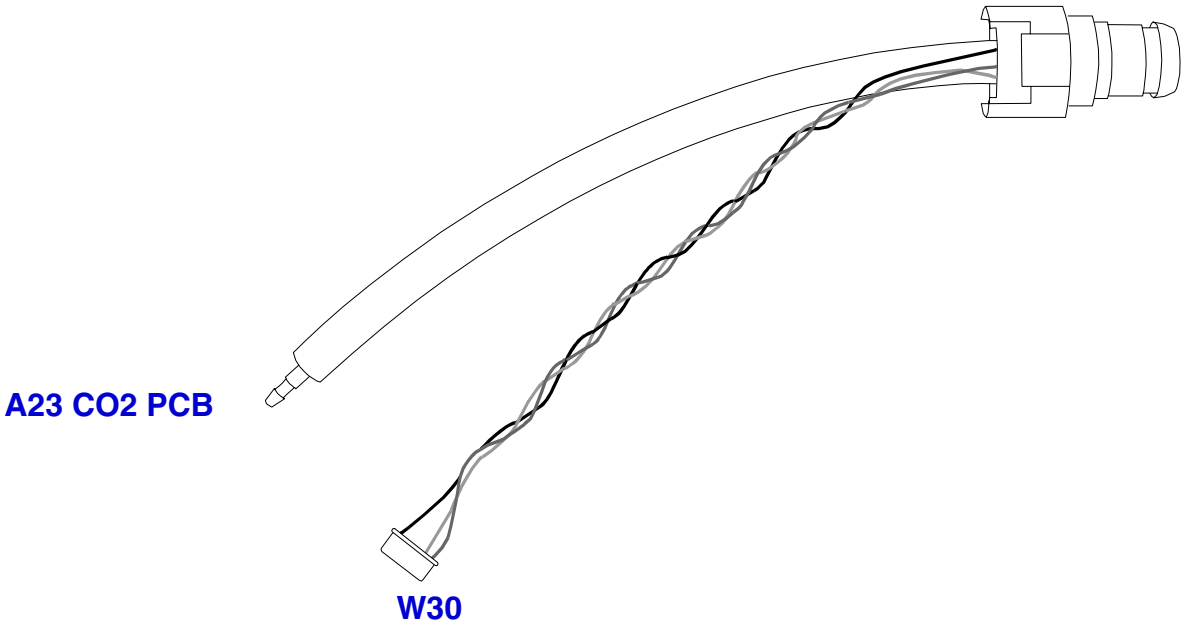


W27 OEM PCB/NIBP PCB Cable, PN 3012181-00

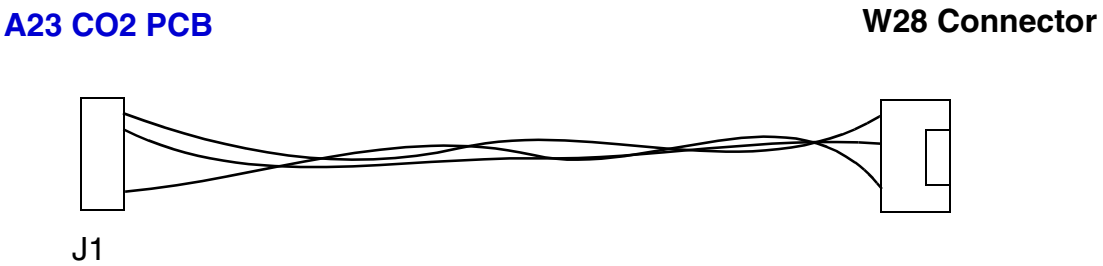


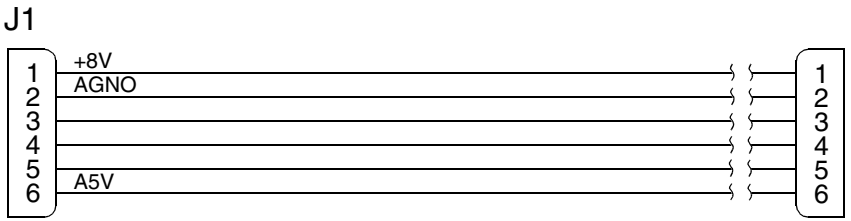


W28 CO2 Connector, PN 3012140-001



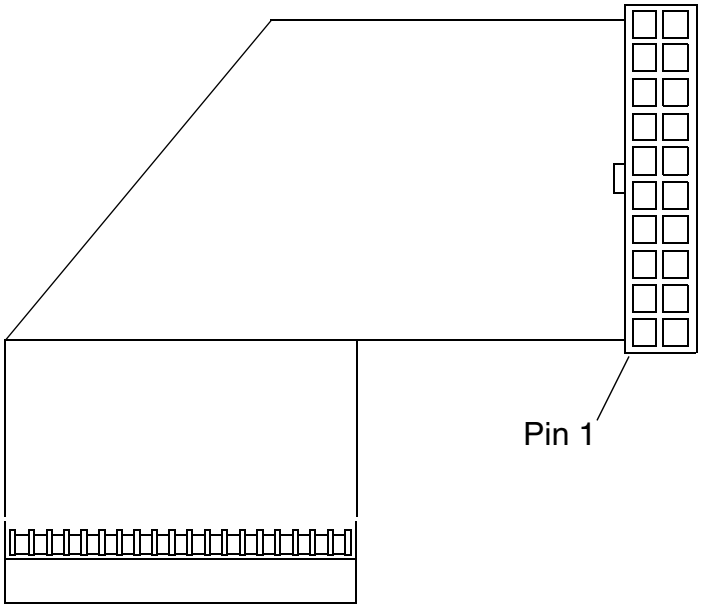
W30 CO2 PCB Adapter Cable, PN 3012397-01





W32 EL Assembly/Interface PCB Cable, PN 3012736-00

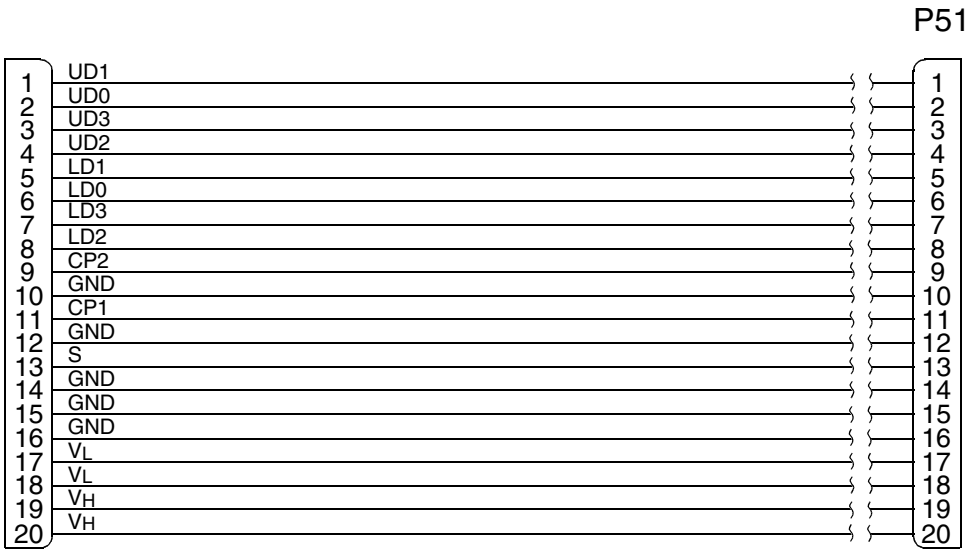
(EL Only—Part of A11)



A11 EL Display

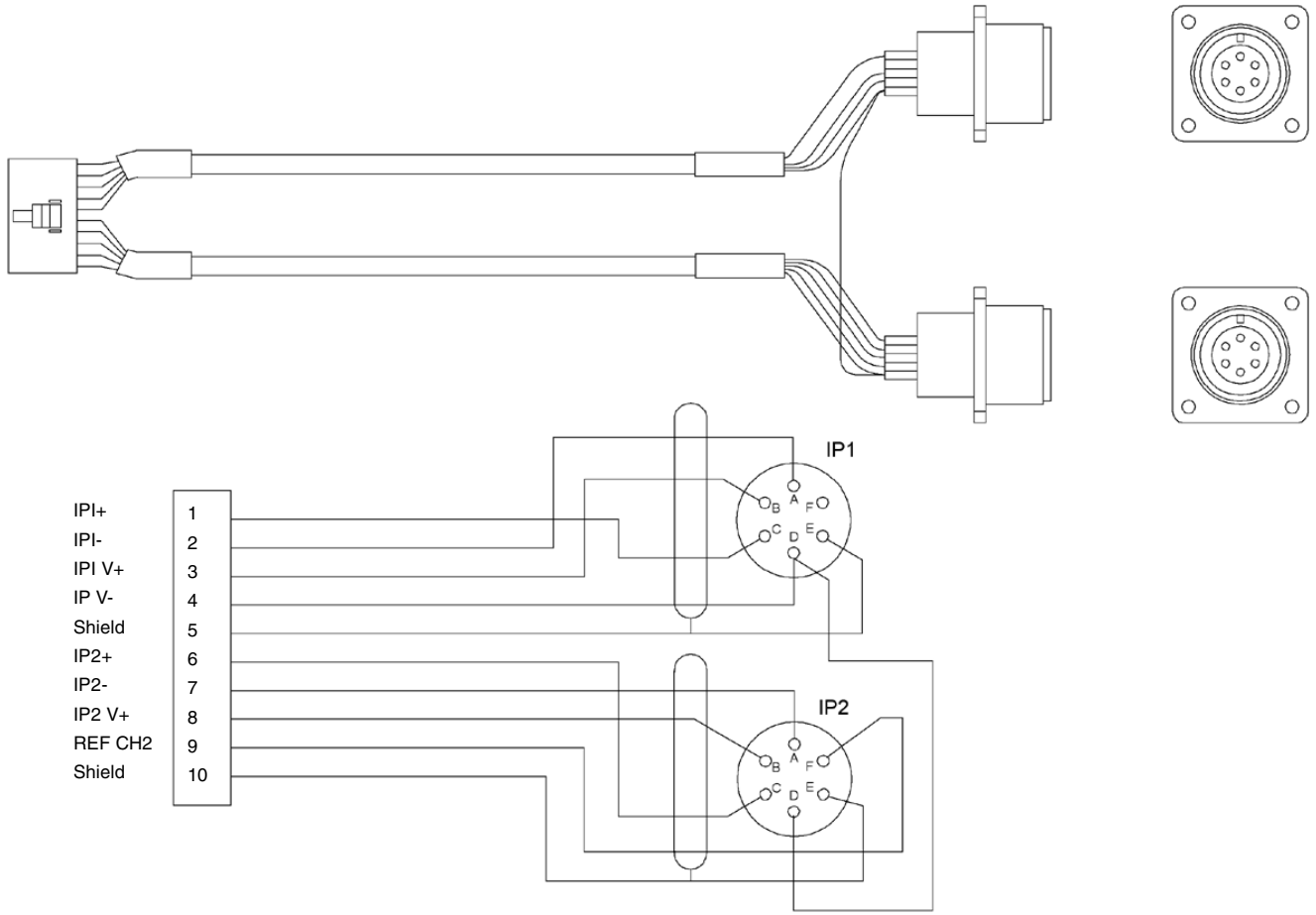
A05 Interface PCB

P51



820

W33 Invasive Pressure Assembly PN 3200466



821

CO2 Exhaust Tube, PN 3012140-002 (Part of A23)

A23 CO2 PCB Pump

Battery Retainer (24)

Service Replacement Kits

The Service Replacement kits include components that support a particular replacement activity.

The Service Replacement kits include components that support a particular replacement activity.

Note: Due to the need for special tooling and processes, the Front and Rear Case Replacement Kits come partially assembled from the factory.

Part Number	Part Description	Note
3011608-00	Front Case Service Replacement Kit—LCD Devices	
3011608-01	Rear Case Service Replacement Kit	
3011608-02	W22 SpO2 Connector Cable Service Replacement Kit	
3011608-03	W07 ECG Connector Cable Service Replacement Kit	
3011608-04	A08 Backlight PCB Service Replacement Kit	
3011608-05	External Hardware Service Replacement Kit	
3011608-06	Internal Hardware Service Replacement Kit	
3011608-07	System/Therapy PCB Hardware SVC Replacement Kit	
3011608-08	Paddle Retainer Kit	
3011608-014	Therapy Connector Service Replacement Kit	

Service Replacement Kits

Part Number	Part Description	Note
3011608-10	EtCO2 Door Kit	
3011608-11	Front Case Service Replacement Kit—EL Display Devices	
3011608-12	OEM Mounting Service Replacement Kit	
3200493-00	Interconnect Cable Replacement Kit (for AC or DC Power Adapters.	

Front Case Service Replacement Kit, PN 3011608-00—LCD Devices

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
2	1	3006113-05	Front Case	Front Case
190	1	3006245-00	W17 Speaker Assembly Felt	Front Case
172	1	3009065-00	Medtronic Physio-Control Icon Label	Front Case
212	1	3006186-04	A11 LCD Assembly Lens	Front Case
242	1	804234-03	Case Perimeter Seal	Front Case

Rear Case Service Replacement Kit, PN 3011608-01

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
4	1	3006114-05	Rear Case	Rear Case
16	1	3006291-00	Drain Seal	Rear Case
28	2	3006766-02	Paddle Cover Latch Assembly	Rear Case
150	1	3010591-04	Rear Case EMI Shield	Rear Case
156	1	804194-00	A15 Energy Storage Capacitor Mount Cover	Rear Case
166	1	3009060-00	FDA Label	Rear Case
168	1	3009061-00	W09 Auxiliary Connector Cable Label	Rear Case
174	1	3009789-00	Left Latch Cover Label	Rear Case
176	1	3009789-01	Right Latch Cover Label	Rear Case
186	4	802278-02	Battery Pin	Rear Case
192	1	804447-20	Adhesive Part, 3.0 W × 2.0 H × 0.1 T	Rear Case
202	4	802885-00	Mounting Foot	Rear Case

Rear Case Service Replacement Kit, PN 3011608-01

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
208	4	804206-01	Battery Grommet	Rear Case
216	4	201508-000	Carbon Steel Lock Nut, 4-40 Thread	Rear Case
264	2	805613-00	ESD Shield Adhesive	Rear Case
266	1	202289-001	Cellulose Sponge, 3.0 W × 1.0 H	Rear Case
303	1	804447-33	Adhesive Part, 1.0 W × 3.0 H × .125 T	**Edmark Only,** Rear Case
W10	1	3009726-08	Battery Pins/A03 Power PCB Cable	Rear Case
24	1	3006375-02	Battery Retainer	Rear Case
340	1	3012209-00	CO2 Exhaust Seal	Rear Case
342	1	3012178-01	CO2 Exhaust Cover	Rear Case

W22 SpO2 Connector Cable Service Replacement Kit, PN 3011608-02

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
206	1	3007996-01	W22 SpO2 Connector Cable Gasket	SpO2 Option
W22	1	3007993-02	SpO2 Connector Cable	SpO2 Option

W07 ECG Connector Cable Service Replacement Kit, PN 3011608-03

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
236	1	805915-01	W07 ECG Connector Cable Gasket	Rear Case
W07	1	3007991-02	ECG Connector Cable	Rear Case

A08 Backlight PCB Service Replacement Kit, PN 3011608-04

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
A08	1	3006806-00	Backlight PCB	Front Case
182	2	3009483-01	A11 LCD Assembly Adhesive	Front Case
264	2	805613-00	ESD Shield Adhesive	Front Case
280	2	201501-017	Adhesive Tape .75 W × .045 T	Front Case

External Hardware Service Replacement Kit, PN 3011608-05

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
36	1	3009412-00	Front Panel Plug	Front Case
178	1	3009790-00	50 mm Printer Screw Cover	Front Case
232	24	201407-069	Nylock Screw, 6-32 × .375 L	Rear Case

Internal Hardware Service Replacement Kit, PN 3011608-06

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
12	1	3009347-01	A01 System PCB CPU Shield	A01/A02/A04 Assembly
188	1	201457-001	Adhesive Cable Tie Mount	Front Case
204	1	3006809-00	Printer Connector Gasket	Front Case
216	14	201508-000	Carbon Steel Lock Nut, 4-40 Thread	A01/A02/A04 Assembly
222	9	200536-001	Self-locking Cable Tie .10 W x 4.0 L	Front/Rear Case
224	1	200536-011	Self-locking Cable Tie .35 W x 21.0 L	Rear Case
226	3	3010805-000	10-Pin Socket Retainer Clip	SpO2 Option
228	2	3010805-001	14-Pin Socket Retainer Clip	SpO2 Option
230	45	202253-761	Nylock Screw, 4-40 x .312 L	Front/Rear Case
234	6	202253-729	Nylock Screw, 2-56 x .312 L	Rear Case/SpO2 Option
240	2	200060-011	System and Aux Connector O-ring Seals	Rear Case
246	1	805338-00	W17 Speaker Assembly Hold-Down Spring	Front Case
248	1	3010569-02	Nylon Hex Standoff	Rear Case
251	9	200266-006	Hex Standoff, 4-40 x .250 W x .375 L	A01/A02/A04 Assembly

Internal Hardware Service Replacement Kit, PN 3011608-06

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
253	1	200266-047	Hex Standoff, 4-40 × 1.656 L	OEM Common Parts
292	4	3011630-00	PCB Spacer	
294	2	3011629-00	Hex Insert	
296	2	202253-730	Nylock Screw, 2-56 × .375 L	
336	10	200804-102	Flat Washer, .125 ID × .312 OD	
356	1	3012120-02	CO2 Connector Cover	
362	1	3012126-00	CO2 Cover Label	
368	1	201694-001	CO2 Cover Magnet	
376	6	202253-730	Nylock Screw, 2-56 × .375 L	
378	1	3012180-01	NIBP Tubing	

System/Therapy PCB Hardware Service Replacement Kit, PN 3011608-07

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
36	2	3009412-00	Front Panel Plug	
230	18	202253-761	Nylock Screw 4-40 × .312 L	
232	18	201407-069	Nylock Screw 6-32 od × .375 L	
296	1	202253-550	Nylock Screw 4-40 × 1.125 L	
336	2	200804-102	Flat Washer, .312 od × .125 id	

Paddle Retainer Kit, PN 3011608-08

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
174	1	3009789-00	Left Latch Cover Label	
176	1	3009789-01	Right Latch Cover Label	
28	2	3006766-02	Latch Cover Label, Paddle	
232	6	201407-069	Nylock Screw 6-32 × .375 L	

Therapy Connector Service Replacement Kit, PN 3011608-014

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
W11	1	3006216-03	Therapy Connector Assembly	
218	1	3008293-00	Therapy Connector Cable Nut	Used on Therapy Connector Assembly 3006216-01, -02
218	1	200040-001	C-Clip	Used on Therapy Connector Assembly 3006216-03
238	1	200060-015	Therapy Connector Cable O-Ring Seal	

EtCO2 Door Kit, PN 3011608-10

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
	1	3201213-00	CO2 Door Replacement Tool	
158	1	3006241-03	Language and Feature-Specific Label	
230	4	202253-761	Nylock Screw, 2-56 × .375 L	
356	1	3012120-03	CO2 Connector Cover	
354	1	3012119-02	CO2 Connector Adapter	

Front Case Service Replacement Kit, PN 3011608-11—

EL Display Devices

The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
2	1	3006113-06	Front Case	Front Case
190	1	3006245-00	W17 Speaker Assembly Felt	Front Case
172	1	3009065-00	Medtronic Physio-Control Icon Label	Front Case
212	1	3006186-05	A11 LCD Assembly Lens	Front Case
242	1	804234-03	Case Perimeter Seal	Front Case

OEM Mounting Service Replacement Kit, PN 3011608-12

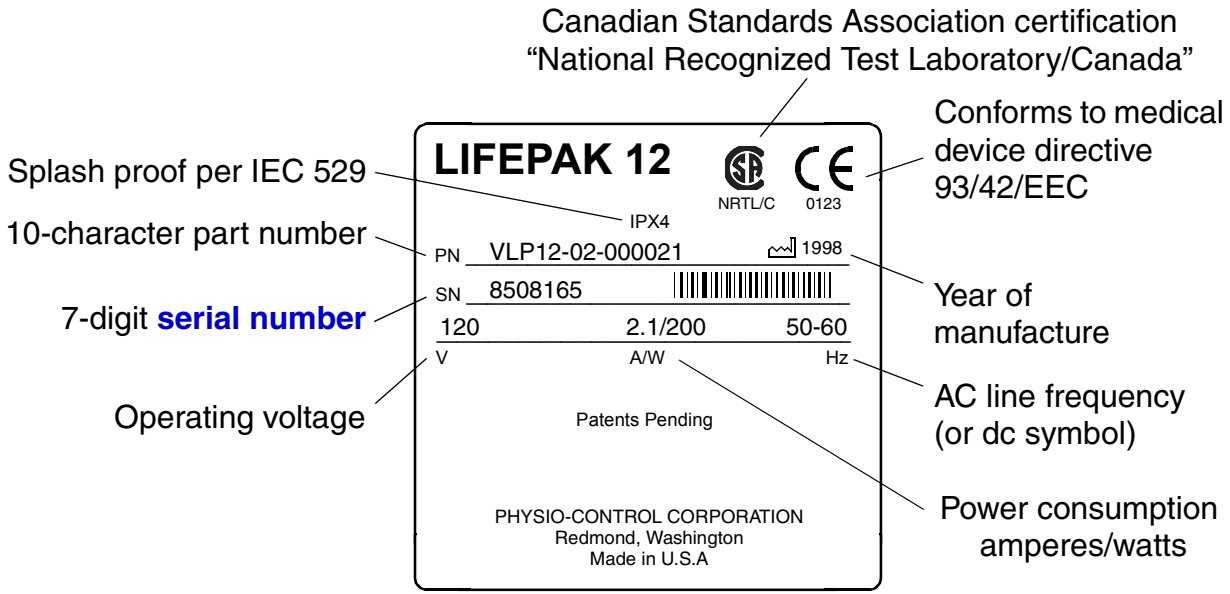
The following is a listing of the items in this Replacement kit.

Item	Quantity	Part Number	Part Description	Note
20	1	3012122-01	Lower Support Foam	
22	1	3012123-01	Upper Support Foam	
384	1	3012421-01	OEM PCB Shield	
228	1	3010805-001	14 Pin Retainer Clip	

Defibrillator Part Number and Serial Number

PN and SN Label

The LIFEPAK 12 defibrillator/monitor serial number (SN) and part number (PN) are noted on a label on the rear case assembly in Battery Well 1.



Understanding the Part Number

The device part number, for example, VLP12-02-000021, reflects the device options, features, language, operating power, and so forth.

Defibrillator Part Number and Serial Number

Understanding the Serial Number

The serial number for the LIFEPAK 12 defibrillator/monitor is related to the sales order created during device manufacturing and appears on the serial number label in Battery Well 1. Use this number when calling to order parts.

Note: Devices with a **Manufacturing Date** before April 30, 1998, reference two separate serial numbers. The higher serial number, the Finished Device serial number, appears on the serial number label in Battery Well 1, while the lower serial number, the Common Device serial number, appears on CODE SUMMARY printouts and on the **Device Log** in the Service Mode. When tracking devices by serial number, be sure to use the number from the serial number label.

How to Order Parts

Ordering Parts

To order parts, contact your local Medtronic Physio-Control representative. In the USA, call PARTSLINE at 1.800.442.1142. Provide the part number and serial number located on the device label in Battery Well 1. Specify all assembly numbers, part numbers, reference designations, and descriptions. Parts may be substituted to reflect device modifications and improvements.

Manufacturing Date

In some cases when ordering parts, you may also need the device manufacturing date. This date is available for viewing by accessing the SERVICE/STATUS/DEVICE LOG and noting the MANUFACTURING DATE. To access the DEVICE LOG, see **About the Device Log** and review the information for the MANUFACTURING DATE.

Serial Number

The serial number of the device identifies the manufacturing conditions and elements used in producing your device. When ordering parts, use the serial number (SN) listed on the label in Battery Well 1.

Numerics

12-Lead/3-Lead ECG Fast Restore Test

A

A01 System PCB Description
A01 System PCB Replacement
A01 System PCB, PN 3006227-07
A02 Memory PCB Description
A02 Memory PCB Replacement
A02 Memory PCB, PN 3008520-05
A03 Power PCB Description
A03 Power PCB Replacement
A03 Power PCB, PN 3006237-06
A04 Therapy PCB – Edmark / A04 Therapy PCB – Biphasic
A04 Therapy PCB Description
A04 Therapy PCB Replacement – Biphasic Devices Only
A04 Therapy PCB Replacement – Edmark Devices Only
A05 Interface PCB Description
A05 Interface PCB Replacement
A05 Interface PCB, PN 3010524-04
A06 OEM PCB Description
A06 OEM PCB Module, PN 3008541-06
A06 OEM PCB Replacement
A07 Contact PCB
A07 Contact PCB Description
A07 Contact PCB Module, PN 3006394-02
A07 Smart Contact PCB Replacement
A08 Backlight PCB Description
A08 Backlight PCB Replacement – LCD Devices Only
A08 Backlight PCB Service Replacement Kit, PN 3011608-04
A08 Backlight PCB, PN 3006806-00 – LCD Only
A09 Small Keypad Language
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A09 Small Keypad, Various Part Numbers
A09 Small Keypad/A10 Large Keypad
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A10 Large Keypad, Various Part Numbers
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A11 EL Display Assembly, PN 3012695-000
A11 LCD Assembly Description
A11 LCD Assembly Replacement
A11 LCD Assembly, PN 3010612-00
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A12 Printer (50mm) Assembly Drawing
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A12 Printer (50mm) Repair Procedures
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A12 Printer Assembly (100mm) Replacement
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A14 Inductive Resistor Replacement – Biphasic Devices Only
A14 Inductive Resistor, PN 301212-02 – Biphasic Devices
A14 Waveshaping Description
A14 Waveshaping Inductor (Edmark Devices Only)
A14 Waveshaping Inductor Replacement – Edmark Devices Only
A14 Waveshaping Inductor, PN 3006221-01 – Edmark Devices

A15 Energy Storage Capacitor (Edmark Devices Only)
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A16 SpO2 PCB Replacement
A17 Interconnect Bracket Description
A17 Interconnect Bracket Replacement
A17 Interconnect Bracket, PN 3008897-01
A21 NIBP Module Description
A21 NIBP PCB Module, PN 3008943-000
A21 NIBP/A23 CO2 Module Disassembly
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A22 Biphasic PCB, PN 3010178-07 – Biphasic Devices
A22 Biphasic PCB/A14 Inductive Resistor Replacement – Biphasic Devices Only
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About the Error Log
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Energy Waveforms
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Front Case Assembly Drawings – LCD Devices Only
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LIFEPAK NiCd Battery Conditioning
LIFEPAK NiCd Battery Description
LIFEPAK NiCd Battery Shelf Life Testing
LIFEPAK SLA Battery Charging
LIFEPAK SLA Battery Conditioning
LIFEPAK SLA Battery Description
LIFEPAK SLA Battery Shelf Life Testing
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Manual Mode Operation
Modes of Operation

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No Pacer, 12-Lead, EtCO2, NIBP
No Pacer, 12-Lead, EtCO2, SpO2
No Pacer, 12-Lead, EtCO2, SpO2, NIBP
No Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP
No Pacer, 12-Lead, NIBP
No Pacer, 12-Lead, No Options
No Pacer, 12-Lead, SpO2
No Pacer, 12-Lead, SpO2, NIBP
No Pacer, 12-Lead, SpO2, NIBP, IP
No Pacer, 3-Lead, EtCO2
No Pacer, 3-Lead, EtCO2, NIBP
No Pacer, 3-Lead, EtCO2, SpO2
No Pacer, 3-Lead, EtCO2, SpO2, NIBP
No Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP
No Pacer, 3-Lead, NIBP
No Pacer, 3-Lead, No Options
No Pacer, 3-Lead, SpO2
No Pacer, 3-Lead, SpO2, NIBP
No Pacer, 3-Lead, SpO2, NIBP, IP

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Pacer, 12-Lead, EtCO2, SpO2
Pacer, 12-Lead, EtCO2, SpO2, NIBP
Pacer, 12-Lead, EtCO2, SpO2, NIBP, IP
Pacer, 12-Lead, NIBP
Pacer, 12-Lead, No Options
Pacer, 12-Lead, SpO2
Pacer, 12-Lead, SpO2, NIBP
Pacer, 12-Lead, SpO2, NIBP, IP
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Pacer, 3-Lead, EtCO2, NIBP
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Pacer, 3-Lead, EtCO2, SpO2, NIBP, IP
Pacer, 3-Lead, NIBP
Pacer, 3-Lead, No Options
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Pacer, 3-Lead, SpO2, NIBP
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